Library usability in higher education: how user experience can form library policy.

Alison Wiles
August 2015

Submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy,
The University of West London.

Acknowledgements

With thanks to my supervisors Dr Stephen Roberts and Dr José Abdelnour-Nocera for their support and guidance. Thanks also to; Maria Pennells, Gill Briggs, Hazel Woodward, my family and friends, the staff and research students of the School of Computing and Technology, and all the participants and respondents who gave their time to take part.

Abstract

The university library has been called *"the heart of a university",* but in the past has been described as being *"virtually unusable".* This exploratory study is an investigation into user experience and usability in university libraries in the UK, and aims to examine the difference between users' experience and their expectations of using their university library. It will also investigate university library policies to determine how a user experience policy can help to improve users' experience.

A user survey was carried out at three UK university libraries, using a questionnaire which asks participants to give their current opinions on their experience of 12 usability properties, and then to rate their expectations of each of the 12 properties. This means that it is then possible to calculate the gap between how the users rate the usability of the library, and how usable it should be. Additionally, a website survey of 121 UK universities was undertaken to see which types of policies UK university libraries have in place, whether a policy for user experience factors exists at these institutions, and if so what the policy covers.

The findings show the areas where the largest gaps between expectations and experience occur. One of the largest gaps at the three institutions concerns the adequacy of the information that users are able to retrieve, and this can be addressed by either improving the library's performance in this area, or by managing the expectations of library users. The website survey of library policies shows that while there is a core of seven types of library policy, user experience policies are unusual.

Library user experience and usability is undoubtedly a field growing in importance in the eyes of librarians and researchers. By taking the "lived experiences" of users into account, and doing this in conjunction with a user experience policy, the university library can become a place of continuous improvement.

Contents

List of Abbreviations

CU	Cranfield University
EU	European Union
HEFCE	Higher Education Funding Council for England
HESA	Higher Education Statistics Agency
ISO	International Organization for Standardization
IT	Information Technology
JISC	Joint Information Systems Committee
NUS	National Union of Students
OCLC	Online Computer Library Center
OPAC	Online Public Access Catalogue
PC	Personal Computer
PhD	Doctor of Philosopy
SCONUL	Society of College, National and University Libraries
TVU	Thames Valley University
UCAS	Universities and Colleges Admission Service
UK	United Kingdom
UoE	University of Edinburgh
UoS	University of Surrey
UoV	University of Virginia
UoWL	University of West London
US/USA	United States of America

List of Figures

1. Introduction

1.1 Overview

This study is an exploratory investigation into user experience and usability in university libraries in the United Kingdom. This chapter will provide a brief background to the topic and discuss the aims of the research.

1.2 Background

The university library has been called *"the heart of a university"*, a phrase which illustrates the high regard in which these places are held (Brophy, 2005, p.1). Similarly, they have also been described as "*the social and intellectual heart of campus"* (Karle, 2008). They are the places that students will go to not only to find and borrow materials, but are also places for studying, socialising and even for sleeping (Grimes & Charters, 2000). However, it has also been noted that some students and particularly undergraduates do not consider the library to be critical to their studies (Adikata & Anwar, 2006), and that rather than using the library building on campus, *"more and more students are entering libraries not through turnstiles but through phone lines and fiber-optic cables"* (Carlson, 2001) as the digital library takes an increasingly important role in students' lives. It has been said that today's university libraries must *"look smart and think smart"*, as while it is architects and librarians who design libraries, it is students who have to use them (Marsh & Bovaird, 2008).

University libraries will vary greatly in terms of design, layout, location and atmosphere and similarly systems and interfaces will vary too, meaning that the library user's experience will differ greatly from institution to institution. Individually, users will have different expectations of what makes a good library experience, but it is important that libraries try to provide this for all of their users. University library visits are made for a number of reasons. They are places where students can go to locate books and other materials relevant to their areas of study, and they also provide an environment for group and lone study. Of course it is now also possible to visit the digital library from the comfort of home, or while travelling via laptops and other mobile devices. In reality the experience of using libraries and their

resources is as complex as it may apparently appear simple and straightforward. A user's library experience will depend on factors such as how easy and effective the library systems are to use, and whether for example he can find a suitable place to plug in his laptop, or to carry out group-work with his classmates.

University libraries also have policies in areas such as collection development, user behaviour, and circulation (i.e. loan lengths and fines). Additionally there may be policies concerning user experience and related themes such as usability.

A definition of user experience from the International Organization for Standardization (ISO) is that it is:

> "(*a) person's perceptions and responses resulting from the use and/or anticipated use of a product, system or service*".

Further to this:

> "*User experience includes all the users' emotions, beliefs, preferences, perceptions, physical and psychological responses, behaviours and accomplishments that occur before, during and after use*"

(ISO, 2010).

Usability can be defined as "*the appropriateness to a purpose of any particular artefact"* (Brooke, 1996). It is a term widely used when referring to computer systems and their interfaces, but it can equally be applied to a non-computerised (or manual) system, or to an article such as a desk or building.

In an article by Spool (2007), the author discusses the difference between user experience and usability. He believes that the term usability asks the question, "*Can the user accomplish their goal?"* giving the example of a shopper being able to satisfactorily use a retailer's website to make a purchase. The question asked by the term user experience is "*Did the user have as delightful experience as possible?".* The author gives the example of the same shopper trying to collect the purchased item from the store, but not being able to initially find the collection point, the item then being out of stock with this then requiring the shopper to make a telephone call to receive a refund for the unavailable item. The shopper is

unlikely to shop with this retailer again, because despite the good usability of the website, the total user experience was poor. The author concludes:

> *"User experience takes far more effort to do well, but the results have far better impact".*

Donald (1998, p.29-30) describes "The Paradox of Technology", or how technology can make life easier as well as more enjoyable, yet simultaneously add complexity so as to increase our frustration at using it. He asks:

> *"But what good is the technology if it is too complex to use?".*

In the past system designers were aware of who their users would be: these people would be involved in the design and testing of systems, and some would also be responsible for training other staff in the use of these systems. However the internet has changed this way of doing things, and clearly it is not possible to train every potential user of a website. Development guidelines for websites have therefore been established. For example Jakob Nielsen is a well-known usability specialist and has ten guidelines or heuristics that he believes website designers should adhere to. These include the website using the same language that a user would use rather than jargon, there being appropriate feedback from the website so that users always know what is happening, and there being consistency of words, terms and actions (Nielsen, 2013). Arguably these heuristics could be applied to other types of systems and not just websites, as a user will always want to know what's happening when they use a particular system. Likewise there should not be jargon and there is also a need for consistency of words, terms and actions in any system whether it be a manual system, website, or other computerised system.

In any university library there will be various systems and interfaces in place to support library activities, and these systems could potentially have thousands of users each with differing levels of computer experience, and also library experience. There will be a system for issuing books, a system for the placement of books on the shelves, a system for ordering items from other libraries, and a system for searching for a particular item on the library catalogue. The

introduction of increased university tuition fees in the UK in the last few years means that students have higher expectations of university facilities, and it is therefore more important than ever that university library systems and interfaces, as well as the library buildings themselves are usable.

1.3 Aim of the study

This study aims to investigate the difference between users' experience and their expectations of using their university library. It will also investigate university library policies and how a user experience policy can help to improve users' experience. Results from the study can be fed back to library managers who can then consider any necessary changes both to the library environment including its systems, and also to library policies.

The study will aim to look at a library as a complete entity. A library is made up of a building, its staff, its users or customers, and its contents in terms of physical and electronic items. These components require systems, both manual and computerised, to be in place. This means that staff have systems for ways of working in the library, there are systems for holding and retrieving library contents, whether these be numbered shelves or digital databases, and there are systems for users so that they can retrieve items or borrow books and other items.

The researcher for this exploratory investigation has worked as a systems developer for a number of years, and more recently worked in a university library, where it was noticeable that many students seem to have difficulty with library systems and interfaces. University students using their institution's library need to understand how the library systems work and how the systems operate in conjunction with each other. A student may be able to find a book on the library catalogue, but can he then locate it on the shelves? If he can, will he be able to issue it successfully using the self-service machine? A user experience policy may be a way of overcoming these types of problems, and therefore this is a topic where further study and investigation would appear to be beneficial.

2. Literature Review

This chapter looks at the literature relevant to the topic area of this study. There will be an explanation of how the literature review was carried out, followed by the review itself.

2.1 Carrying out the Literature Review.

Pickard (2013, p.25-7) explains that a literature review needs to identify what is known about a particular topic in order to discover what needs to be explored further. The author goes on to establish four phases for carrying out a successful literature review. Firstly there is the information seeking and retrieval phase when a researcher needs to search for appropriate sources and efficiently scan the literature in order to identify suitable articles and books. Then there is the evaluation phase when a researcher judges the source based on criteria such as the author and subject. Thirdly, there is the critical analysis phase which involves a researcher systematically examining and analysing the literature content. And finally, there is research synthesis, when a researcher synthesises what has been found in order to provide both background and context to the area to be studied.

For this study, the researcher followed this framework in order to produce the literature review. Having previously carried out a brief review of literature on the topic of library usability, the researcher was aware that it was an area where increasingly librarians and other researchers were carrying out studies. The aim of this literature review was initially to clarify the research area by identifying gaps in knowledge, and then to find the most important and relevant pieces of research in the research area. The researcher also aimed to find sources of background information in order to “set the scene” for the study, and finally looked for some of the more interesting or unusual studies in the research area.

For the first phase of information seeking and retrieval, the researcher used a guide to library resources from her university library which identifies which databases are the most relevant for each subject area. This study falls under the

subject areas of Libraries and Information Science, but also Computing (human factors), and the library databases suggested for these included:

- ABI/Inform
- EBSCOHost
- ACM digital library
- ASLIB index to theses
- Emerald
- ERIC
- IEEE digital library
- LISTA
- Proquest (ABI/Inform).

The university library now has the software Summon in place so that researchers can search in one place, but when this study was started the researcher individually searched each of the relevant databases to find material, using the necessary syntax. The main keywords for these searches were:

- library
- usability
- higher education
- user experience
- policy.

Bryman (2008, p.118) explains that once keywords have been established, researchers need to think of synonyms or alternative terms as authors may use different words in different ways. Researchers should also be prepared to experiment and amend keywords as their searches continue.

In this study, synonyms for the keywords listed above were used in searches for literature:

Keyword	Synonym or similar
Library	Learning centre (center), resources, collection, information centre (center)
Usability	Use, user, usage, effectiveness, user-centred, interface, user-friendly
Higher education	University, academic, academia, college, institution, organi(z)sation, education
User experience	satisfaction with, library experience
Policy	Rules, approach, plan

Fig. 1 Keywords and related synonyms.

Although this is a study of UK libraries, relevant studies from other parts of the world and in particular the USA, were reviewed. For this reason, American spellings of words were used in searches.

The majority of literature on the topic of library usability dated from 2000 onwards (due to mainstream use of the internet from this time). However the literature search was not restricted to this time period and a relevant study from 1991 was found. Although the topic is university libraries, the researcher extended the search to public libraries, and as a result an interesting paper was found about a public library simultaneously refurbishing its building while re-designing its website so as to revitalise the whole library experience.

The researcher also used the library catalogue of her university library to find relevant books, and an advantage of carrying out research in other university libraries was being able to access their book collections. Additionally there are information resources available from library-related organisations such as the Chartered Institute of Library and Information Professionals (CILIP), or higher education bodies, for example the Universities and Colleges Admissions Service (UCAS). Broadsheet newspapers such as The Guardian and Daily Telegraph also have useful articles related to higher education and libraries.

Once relevant research papers had been retrieved, the researcher was able to evaluate the literature, analyse it and then synthesise it. The literature review was an ongoing part of this research project, and as it continued the main themes emerged. For example the retrieval of a study about the usability of public

transport systems and how this is related to government policy led the researcher to investigating library policies.

The Literature Review has been split into five themes. It will discuss university libraries in the UK, library user studies, library usability studies, socio-technical theory, and library policies.

2.2 University libraries in the UK

Many people throughout the world are familiar with UK universities due to the international reputations of institutions such as the Universities of Oxford and Cambridge, and Imperial College. Others are not so well-known, but there are currently more than 300 universities in the UK including higher education colleges, of which some 120 are major university institutions (UCAS, 2011). There were approximately 1.75 million students enrolled as undergraduates in these institutions in the academic year 2013-14, with a further 539,000 postgraduates studying at UK universities (HESA, 2015), making a large and diverse user population for university libraries.

The UK higher education system has undergone some financial changes in recent years with the introduction of increased tuition fees for students coupled with budgetary constraints due to the effects of the global financial crisis. Cuts to university budgets were announced by the UK government in 2010, the first time that the then Labour administration had given below inflation level awards (Paton, 2010). Up until the academic year 2011-12, student numbers were at record levels with 49 per cent of young people in England going into higher education, compared with 43 per cent five years previously (Coughlan, 2013). However, the rise in tuition fees from a level of around £3000 to up to £9000 per year for 2012-13 meant that 27,100 fewer students were accepted in UK universities that year, a drop of five-and-a-half per cent from the previous year (Paton and Stubbins, 2013). This trend was reversed for 2013-14 with a rise of eight per cent in student numbers compared with 2012-13 (HEFCE, 2014), and looking forward to the 2015-16 academic year, it has been reported that applications to UCAS are at a record level and up two per cent year-on-year (Gurney-Read, 2015).

In addition to this, an important change regarding student recruitment has taken place recently. Changes to funding rules allow universities to recruit an unlimited number of UK and EU students, whereas in the past the numbers were capped. A survey of 70 English universities by the Guardian newspaper showed that 50 per cent of these institutions plan to increase their student numbers over the next five years, with as many as 45,000 extra places being available in 2015-16 (Ratcliffe and Shaw, 2015).

Distance learning is becoming more popular possibly as a result of the increased costs of a university education. The number of distance learners at UK universities rose by approximately 14 per cent between the academic years 2006-7 and 2010-11: now it is not just the Open University, the traditional provider of distance learning in the UK that offers the chance to gain a degree in this way, as many other institutions provide this option for learners based both in the UK and overseas (Swain, 2012).

UK universities can be sub-divided into a number of different classifications. For example Ancient universities meaning those founded before the 19th century or New universities being those granted a charter from 1992 onwards. Other types include Red-Brick universities which are those created between 1900 and 1963, and Unique institutions such as the Open University, or Cranfield University which is a solely postgraduate institution (The Student Room, 2013). Each UK university will have one or more library buildings on its campuses, each with a number of specialist and administrative staff, and all students at the universities will be encouraged to use their library to its full potential.

University libraries in the UK are represented by the Society of College, National and University Libraries (SCONUL) which:

> "...*promotes awareness of the role of academic libraries in supporting research excellence and student achievement and employability, and represents their views and interests to government, regulators and other stakeholders. It helps academic libraries collaborate to deliver services efficiently, including through shared services, and to share knowledge and best practice*"

(SCONUL, 2013a).

SCONUL argues the case for the university library stating that it is a blend of a repository, a service, and a place to study. It has compiled a list of 16 reasons for valuing academic libraries. Among these it emphasises the importance of satisfaction with library services as being a consideration for prospective students, and the fact that good quality library services can help to both attract and retain high quality academic staff. It also notes that students are now visiting their library more frequently and spending a greater amount of time in them despite the availability of more electronic resources, and that in subject areas such as humanities and arts, students may actually spend more time with a librarian than with a lecturer (SCONUL, 2013b).

Rowlands et al (2008) discuss the changes facing university libraries. They describe library users as having become *"information consumers"* who not only look at the electronic content of the library, but also at commercial search engines (such as Google), social networking sites (for example Facebook and Twitter), wikis, and other resources. The authors stress the importance of data collection and analysis in libraries so that users' needs can be met, and suggest that major libraries should have user studies departments to build a clear picture of user behaviour for the future.

In 2009, a campaign from the educational research group JISC debated the future of university libraries in the UK. Among the questions it asked was:

> *"In an information world in which Google apparently offers us everything, what place is there for the traditional, and even the digital library?"*

The campaign aimed to raise awareness and generate discussion on the topic by giving librarians the opportunity to pool their expertise and disseminate ideas, allowing library managers to engage in strategic thinking, while users had the chance to have their views heard (JISC, 2009).

The "open access" availability of information is becoming an important topic for libraries, and a group of librarians and other experts met at the British Library in April 2012 to discuss the impact of this on the university library. The group concluded that libraries will undoubtedly change as a result of the unrestricted

availability of scholarly information, and there will be greater emphasis on the sharing of information between institutions. Librarians however will still be required to guide users, and academic libraries will continue to be an important element in the research process in their institutions and beyond (Harris, 2012).

University library staff see delivering electronic books (e-books) and other digital resources as the top priority for the future, a survey of UK university librarians showed. Other priorities are determining the future role of the library in higher education, and issues with library buildings. Two-thirds of university librarians believe that the main reason students use library facilities will change over the coming years, with there being a shift from libraries being places for borrowing books and other materials, to a place to complete assignments (OCLC, 2012).

The University of Worcester and Worcestershire County Council have taken an innovative approach to providing library services with a library funded jointly by the university and the local authority, the first of its kind in Europe. The new library opened in September 2012 and it was a challenge to develop the services required by users of what is both an academic and a public library. Longer opening hours benefit the public library users who may be inspired to enter higher education, while university students have the benefits of being able to access services offered by public library provision. The director of information and learning services at the university believes that this model could be suitable for many inner city locations in the UK (Hannaford, 2012).

In recent years, the British Library has pledged its support to UK university libraries with the chief Roly Keating describing these places as:

> *"...a privileged special public space, where specialists can come together and share".*

Mr Keating also stressed that the British Library will support libraries over the coming years as they respond to the financial challenges of recent times (Reisz, 2013).

2.3 Library user studies

University libraries are moving rapidly towards a "self-service" culture. Whereas in the past university library staff would assist or actually carry out searches for books and literature, as well as helping with other library services, the onus is now on users to perform their own searches and find their own material using the interfaces, databases and search engines available over the world-wide web. Similarly, users are expected to issue books using self-service machines, and print their own articles. This has arguably simplified library use, while simultaneously bringing in a whole new set of problems.

It is not unusual for researchers to study library use and experience, and also library system usability. Pantry and Griffiths (2009, p.1) believe it is vital for library services to keep one step or more ahead of users, as user behaviour is constantly changing, and often at a rapid pace. Greifeneder (2011) agrees with this viewpoint that new technologies in libraries mean there is *"an obvious need for user studies".* And it should not be forgotten that traditional, physical libraries can also be regarded as systems (Makri et al, 2007) meaning that user studies of this domain are important too. Many of today's university students belong to the "Google generation" and have little or no recollection of life before the advent of the internet. They prefer to use search engines (such as Google) rather than physical or digital libraries as they better suit their university lifestyles (Rowlands et al, 2008). If libraries are to continue to be important places in universities, they must therefore adapt to meet their users' new and changing needs.

Interest in user experience in libraries is growing. A conference on the topic, *"UX Lib: User experience in libraries"* was held at the University of Cambridge in March 2015 with the organisers noting:

> *"You'd be hard pushed to attend a library conference over the last 12 months that didn't offer presentations on ethnography or usability".*

The conference aimed to cover themes such as usability of websites, but also intended to consider the use of physical library spaces (UX Lib, 2015). Similarly, a new journal *"Weave: Journal of Library Experience"* was launched in 2014. This

open-access, peer-reviewed journal plans to provide a forum for library user experience practitioners, and the editors make the claim that:

> *"…library user experience is taking a more central role than ever"*

(Weave, 2015).

As long ago as the early 1990s, a study by Andrews (1991) established that students had difficulties using their university library. The author stated that students could find academic libraries "*complex and intimidating*", and that some experts at the time believed they were places that were "*virtually unusable*". Research took place at Manchester Polytechnic (now Manchester Metropolitan University) and consisted of interviews with 29 students. It was found that problems existed with locating books, using the library catalogue, the classification scheme, and the general library layout. For example some students did not understand the Dewey classification system, or the way that this can physically separate seemingly similar books. There were also students who felt very anxious about using the facility, especially more mature students who may have returned to full-time education after some years. The author concluded that this type of research can have great value in pinpointing the problems that students encounter in university libraries, so that libraries which are easier to use can be developed.

The topic of library anxiety amongst students which Andrews came across in her study, has also been investigated by Jiao and Onwuegbuzie (2004). They refer to Mellon's 1986 study of the topic which found that 75 to 85 per cent of undergraduate students initially feel anxious when using their university library, with this leading to them experiencing negative emotions, tension, fear and mental disorientation. One of the triggers of this worry is a lack of familiarity with library equipment and technologies, and the authors believe that many students are struggling to deal with the changes occurring in libraries due to rapid advances in these technologies. They theorise that it is likely that library anxiety is partly caused by students attitudes towards computers, and would like to see students with high library anxiety levels and poor computer attitudes offered more help to gain the skills required to overcome these issues.

In a study by Grimes and Charters (2000), the authors consider that academic staff are often shocked when undergraduate students claim that they cannot locate an article or other item in the campus library, and that it is often assumed that such basic library skills are taught "*somewhere else by someone else"*. Students may however have alternative ways other than using library services of meeting their information needs. Sadeh (2007) maintains that search engines or other internet tools are often preferred to library systems because of their ease of use, ease of access, and speed. They are also easier to learn to use initially, offer immediate satisfaction, and are more fun to work with. The author concludes that libraries should work with library resource vendors to produce interfaces to suit today's preferences, and that libraries must also adapt to the changing world to accommodate the current and future needs of users born into the internet age. He adds that this is the way to "*bridge the gap between library offerings and user expectations".* Similarly, Rowlands et al (2008) believe that libraries need to learn from the searching and personalised guidance offered by the internet retailer Amazon, and should connect to the larger digital consumer world via websites such as Facebook and YouTube.

Library staff can also have an impact on a user's library experience. Studies in this area have looked at staff training (Sidorko and Woo, 2008), and the use of emotional intelligence in user-librarian interactions (Mills and Lodge, 2006). Karle (2008) believes that librarians must have a user-friendly image if the library experience is to be invigorated for the future. The author believes that:

> *"Academic librarians can create experiences that shape the perceptions and heighten the enthusiasm of their students in order to make the overall library experience more appealing".*

Although Magoolaghan (2008) discusses the changes made to a public library and its website, the points raised can be equally applied to a university library setting. A small public library in Philadelphia had space problems and an *"ailing"* website, and a project was begun with the aim of *"...rethinking the user experience to help bridge the digital and physical realms".* This was done by enlisting a building consultant and architects to redesign the building, while a group of information science students were given the task of improving the website. The two projects

ran simultaneously so as to revamp the whole library experience, but it was soon realised that the projects needed to be approached in a co-ordinated manner rather than separately to re-design "*the end-to-end library experience"*. A questionnaire for library users along with user interviews and card sorts gave a comprehensive view of how the users actually use the physical and virtual libraries, and the findings also highlighted the poor usability of the library website. The author emphasises the importance of a user-centred design approach for libraries, with user research being vital in the work towards bridging the library's virtual and physical domains.

A similar study in an academic library took place at the University of North Carolina with the aim of re-designing the library website and the first floor of the library building. Researchers Wu and Lanclos (2011) state:

> *"It is crucial for academic libraries to have a holistic sense of what people actually do when they need to know things".*

Ethnographic research took place at the library involving forums which allowed students to draw or write lists about their ideal website. They also drew plans showing the furniture and services they wanted on the first floor. Observation of library activities and interviews with students also took place, and the researchers believe that these methods can be very effective in revealing the gap between what people say and what they do. They conclude that the library is now a more agile place which is responsive to the workflow of the university.

Pomerantz and Marchionini (2007) consider how a library's physical space can strongly affect a user's experience. With some libraries being masterful architectural works or even "*cathedrals of learning"*, the authors believe that digital libraries can seem impoverished in comparison. They add that as more digital libraries are created the library's role as a storage space will become decreasingly important. At the same time its role as a space for users to be involved in individual and collaborative work, and as a space for social activity will become increasingly relevant.

The role of university libraries as social spaces is also discussed by Secker (2008) and refers to the work of sociologist Ray Oldenburg and his concept of "third places" which are places that are not home or work, but places of engagement for the community. A library can be seen as a third place, and Secker points out that this challenges the belief that library users are merely interested in the digital and paper resources, and not the physical environment of their library. Powell (2002) agrees that physical library space is important when he observes that the design of it can aid or even impair students' ability to reach their academic potential. He adds:

> *"Reports of the death of the physical academic library have been greatly exaggerated".*

However while the physical library may currently be an important place, will this be true in the foreseeable future? Ninety per cent of UK library staff believed that use of online library resources would increase from 2012 to 2014, but only 38 per cent thought there would be an increase in physical library use in the same period, with 14 per cent predicting an actual decline in use (OCLC, 2012).

Gerke and Maness (2010) discovered a link between users' satisfaction with the physical library and that with the digital library. Analysis of LibQUAL+ survey results from 520 participants at the University of Colorado showed a significant correlation between these levels of satisfaction. Despite the move towards the digital library, it would seem that the physical library is still important, and the authors conclude that in planning the future of university libraries:

> *"...the physical component of the library must remain an integral part of the discussion*".

Another JISC (2010) study investigated the design of learning spaces in the twenty-first century and emphasises the need for flexible, future-proofed, creative and supportive spaces that motivate learners and promote the activity of learning. The study goes on to say that it is important to involve learners in the design of spaces, but adds that there are challenges in the creation of them, for example with the management of sound, heating and student activity.

Students tend to have strong opinions about what makes a good university library environment. Gelfand's research into the viewpoints of undergraduates at the University of California showed that they are unwilling to use a library which is not an inviting environment, especially when there are alternatives such as Starbucks coffee shops and Barnes and Noble book stores. One student participant even described the university's library as looking like a prison, while others commented on the need for quiet places to study, areas for laptop use, better furniture and decor, and a cafe. Human contact also is also a priority for students with a *"comfort zone"* being created for library users if they see a librarian on entering the library building rather than having to search for one (Gelfand, 2005). With a similar theme, Lefebvre (2002) studied the refurbishment of the university library at Saint Mary's University in Halifax, Nova Scotia. Prior to the refurbishment, the researcher describes it as *"dark and uninviting"*, and explains that the friendliness of the staff was *"undermined by the gloomy and tired demeanour of the building".* The results of user surveys showed that a significant number of students preferred to carry out their research projects in local coffee shops rather than in the university library because they prefer the atmosphere, like the up-to-date materials, and value the availability of the coffee shop facility. Other services that would encourage students to use the library on a more regular basis included better climate control, better lighting, the provision of a lounge area, and allowing the consumption of food and beverages.

The refurbished library at the University of Sao Paolo in Brazil was the subject of a study where researchers used focus group interviews to evaluate students' opinions of the refurbished library. The researchers point out that it is especially important in developing countries to evaluate how a new facility will be used and perceived by users because financial investment is even more difficult to acquire in these countries. Users had considered the university library at Sao Paolo to be a *"terrible place"* to study due to inadequate lighting, narrow space between the shelves, insufficient numbers of tables and chairs, and a lack of group study places. There was also a lack of privacy when studying and poor cleaning practices. However, the refurbished library was considered by students to be much more pleasant and bright, and it was also noted that library staff are more attentive towards users' needs with a significant increase in customer service levels. The

researchers conclude that the library has decided to use focus groups with users in the future when planning changes because it found that allowing users to express their opinions was a productive process (Leitao & Vergueiro, 2000).

A radical approach to library refurbishment was taken by The University of Texas at Austin, and it made headlines when it removed the book collection from its undergraduate library. In fact the 90,000 books formerly housed there went to another library, while the space left behind was turned into an information commons with comfortable seating, flexible study spaces, over 200 computer stations, a writing laboratory, auditorium, and a careers centre. Managers at the campus believe that the typical student requires the library to primarily provide a place to sit down and use a computer, although students will also use it as a place to rest, read, talk, or to escape the oppressive Texas heat. An undergraduate student comments that he likes to use the library to study for a quiz, check his email, read a novel or even take a nap, while he describes the library website as offering *"great resources"* that can be accessed off-campus (Albanese, 2006).

Another unusual library building project took place at US institution Groucher College in Maryland. It spent forty-eight million dollars on its library building in the hope of invigorating the campus as a social and academic hub. The new library has an art gallery, restaurant, exercise equipment, and a large gathering space or forum which seats over 700 people. However, books still have a prominent place along with traditional library components such as issue desks and desk-top computers. The college president saw the new library building as a chance to be imaginative, and believes that the library's importance has not been diminished by the inclusion of these new features (Carlson, 2009).

In the UK, students are keen to use their university library as a social space, with designated areas being used for socialising as well as learning (NUS, 2008). Watson's study of the development of Glasgow Caledonian University's library, the Saltire Centre, discusses how the spaces we work, live and learn in have profound impacts on how we feel, behave and perform. He adds:

> *"The importance of thinking of our buildings as experiences cannot be underestimated".*

The Saltire Centre aims to put learning first by focusing on the library building itself, and not only on people and technology, and the theme of the third place is evident with it being described as *"an educational third place"*. Each of the building's five floors has a separate environment meaning that the experience is different in each one, and colour and graphics are used to send subtle messages to users about expected behaviour (Watson, 2008).

The needs of postgraduate students can differ from those of undergraduates in terms of physical and digital library spaces. Beard & Bawden (2012) investigated the library issues affecting postgraduates at three UK universities, and found that the physical library is still important to this group as a place to study, although many research students prefer to work at home or they have office space for this purpose. The researchers also found that postgraduates like to have silent workspaces available to them in the library. They conclude by emphasising the need to respond to the requirements of postgraduates due partly to the economic importance of this group to UK universities.

2.4 Library usability studies

The growth of the internet has meant that the concept of usability has become increasingly important. As discussed previously, a user will view how usable a system is by whether they can achieve their goal (Spool, 2007), whether this be buying a product, booking a hotel, or borrowing a book. Usability is strongly associated with user experience, and within ISO's extended definition of user experience it is noted that the related term of usability is relevant when discussing user experience:

> "*Usability, when interpreted from the perspective of the users' personal goals can include the kind of perceptual and emotional aspects typically associated with user experience*"

(ISO, 2010).

Nielsen and Mack (1994, p.3) give the following definition of usability:

> *"Usability is a fairly broad concept that basically refers to how easy it is for users to learn a system, how efficiently they can use it once they have learned it, and how pleasant it is to use".*

This definition furthermore relates usability to user experience when it considers whether a system is pleasant to use, referring to the emotions or responses that users may experience.

Alshamari and Mayhew (2009) believe that:

> *"Usability is one of the most important success factors in system quality".*

They add that most definitions of usability stress the importance of three factors: efficiency, effectiveness, and user satisfaction, and that usability evaluations need to ensure that these are taken into account. These authors also describe the four types of usability evaluations. Firstly there is metrics-based testing where tools are used to quantitatively measure factors such as speed of transactions. Secondly usability inquiries allow testers to communicate with users to uncover problems. Thirdly usability inspections occur when experts review interfaces to find problems, and finally usability testing takes place when users are asked to carry out tasks as data is collected. Researchers will use different research methods depending on which evaluation type they are undertaking. George (2009, p.132-3) lists the main methods:

- Heuristic evaluation – used by developers and experts to look at a system using general principles for interface design (or heuristics).
- Cognitive walkthrough – used by developers and experts carrying out real tasks to evaluate a system.
- Think aloud protocol – users are prompted to talk about their thoughts on a system while carrying out tasks.
- Focus groups or interviews with users.
- Remote observation – users are located in a separate room to observers and specialised software allows observation of tasks.

- Task tests – users carry out pre-defined tasks, and metrics such as error rates or completion times are compiled.
- Post-test questionnaire or interview – users are asked their opinions of a system or interface.

In their examination of the future of library systems, Showers and Enright (2013) emphasise that *"the user is increasingly at the heart of the conversations about library systems"*, and that roles such as usability experts may be required alongside typical library roles. They believe that libraries and their systems must be responsive to the expectations and needs of users as they continuously change.

Seffah et al (2006) discuss how good system usability not only improves user speed and accuracy when carrying out tasks, but it can also ensure user safety for example by protecting them from repetitive strain injury. The researchers argue the case for a consolidated usability model for software developers based on ten usability factors as a way of bringing together existing models into one which itself is more usable. This builds on the three usability factors discussed earlier, and identified by the ISO, efficiency, effectiveness, and satisfaction, to include others such as learnability - how easily the features can be mastered, safety – whether the software limits the risks of harm to people or others, and usefulness – whether the software assists users to solve real problems. The factors are split into 127 specific metrics which are measured via log files, video observations, interviews, and surveys.

Similarly, Koohang (2004) developed a usability instrument for measuring users' views of digital libraries. The author stresses:

> *"Similar to any product or system, a digital library must possess usability properties*".

A panel of experts comprising of five university professors from the fields of information technology, information systems, and information science determined the 12 usability properties which could be applied to digital libraries. These properties included simplicity – the digital library must be simple to use, control –

users must feel in control when using a digital library, and navigability – users must be able to navigate the digital library with ease. Once the properties had been determined, a questionnaire was developed which asked users for their opinions on each of the properties. Analysis of the results of 293 students completing the questionnaire showed it is a reliable instrument and *"highly suitable to measure users' views about the usability of digital libraries"*. In conclusion, it is an instrument that can be used as the basis for future research into users' opinions of digital library usability.

Building on this piece of work, Koohang and Ondracek (2005) used the usability questionnaire to survey 107 students at a large university in the Midwest of the USA. The questionnaire was extended so that it was in two parts, with the first part asking users for their current views about the usability of digital libraries, and the second part asking for views on perceived importance, or how important each of the usability properties is to them. By having these two distinct sections, the gap between participants' views of what is currently available, and how important each property is to them, can be calculated, and from this it will be possible to either improve what is available, or re-negotiate expectations so that the gap is closed. The authors see this as a way for digital library providers to use usability as a way of gaining competitive advantage in the marketplace for their products.

Usability testing in libraries has undoubtedly become more commonplace in the last seven to eight years. When the researcher for this study briefly investigated this area in 2007, there were relatively few papers published on the topic. There are now many more papers, and this section aims to discuss the more important and interesting ones. These have utilised research methods such as observation, focus groups, questionnaires, heuristic evaluations, and card sorts.

It is important that libraries ensure that their interfaces are usable and that users are put at the centre of the interface design process. George (2008, p.7) emphasises this when she states:

> *"If libraries want people to access their online resources, it becomes their responsibility and a priority to provide their resources in a user-centred environment".*

It has also been noted that if library users do not find a suitable article when searching for information, they may simply decide to leave the search instead of refining it (Coker, 2007), and similarly Chen et al (2009) argue that:

> *"...the key to the success of libraries in the electronic age is the value of the interface that they provide between users and information spaces".*

Porter (2007) believes that libraries should keep up-to-date with usability testing trends by reading business literature, and should be willing to combine task-related testing with detailed interviews.

Driven by "*a lack of literature on the topic*" Battleson et al (2001) undertook a case study looking at the usability of the website of the library of the University of Buffalo. At this time libraries were beginning to show an interest in website usability, but the researchers believed there was a fundamental need for it as library websites evolved and grew into gateways to huge amounts of information. A set of task-based questions was designed which required the participants to search the website for answers, with the questions worded so that they were a test of the website design rather than the participants' library knowledge. Participants were encouraged to think aloud while performing the tasks, and were also asked for written comments at the end of them. Eleven students took part and the study's findings supported Nielsen's views that a relatively small test group was required to find the website's problems. The authors concluded that usability testing in libraries needs to be a continuous process, and not just carried out initially. Furthermore, as libraries try to meet the ever-changing needs of their users, the importance of usability testing in a library environment cannot be understated.

Similarly Cockrell and Jayne's (2002) research into the usability of the Western Michigan University library website, utilised task-oriented formal testing with think aloud protocol so that participants' reasoning, interpretations and opinions were articulated. Student participants were given 20 tasks to carry out which included attempting to find particular magazine, journal and newspaper articles. A total of 49 students participated, with this sample size chosen in order to lend the results more credibility within the library. The study showed that participants found it difficult to locate the articles, some tended to give up the search very quickly, and

that many struggled with library terminology on the website. The study made a series of recommendations about website design such as better help guidance in simple, direct language, and the creation of a glossary of library terms. The authors conclude that library staff felt *"empowered and energized"* following the study because they learned about users' needs and became aware of the areas requiring attention to improve user experience.

Card sorts were the preferred method for assisting users to redesign the website of the library at the University of Illinois (Lewis and Hepburn, 2010). Postgraduate students showed the most interest in taking part in the redesign, which the researchers speculate is because they are more avid users of library facilities and therefore have more interest in its redesign. The 15 participants were asked to sort a set of 93 numbered cards. On each card was a label of library content, either one that already existed or a potential future one, and participants sorted these into piles of categories, while thinking aloud. They also labelled each pile of cards with a suitable category name. The researchers note that this method gives the participants *"incredible freedom"* to make decisions, and this should result in a truly user-centred website. This is especially true of the labels to be used on the website, as these can be used in place of library jargon.

Researchers at the University of the West Indies aimed to identify the major strengths and weaknesses of the university library's website which had been in use for seven years, and which the library systems manager believed was ready for revision. A usability questionnaire was carried out with 529 participants, there were focus group sessions with 16 participants, observation of 21 participants in formal usability tests took place, and there were card sorts with nine participants. Feedback gathered from users from this process could then be included in the redesign. The findings showed that the labelling and the organisation of the content within the website were the two most significant problems for users, particularly *"a cluttered interface unhelpful to the novice user"*. The researchers concluded that a number of changes to the website were required to address problems found by participants, and suggested the addition of a website evaluation tool to gather user feedback in an ongoing manner. Usability training for

library staff should also be considered for the future, so that usability becomes a part of the culture of libraries (Rogers and Preston, 2009).

A comparable investigation at a New York college by Corbus et al (2005), involved 28 users helping to redesign the college library website. The original website was very basic and the need to enhance it had become apparent, so a committee was formed to oversee the redesign project. A series of ten exercises was developed, and student participants were observed as they carried these out, while their key strokes were recorded using screen capture software. They were also encouraged to think aloud as they did the exercises. Two rounds of testing occurred with a second group of participants evaluating the redesigned web pages. The researchers consider this cycle of iterations of redesign and re-testing important in order that the website changes with users' changing needs, while having users continually evaluating the website will help library staff to become more responsive to their customers' requirements. The project has provided library staff with a model for testing the usability of the website on an ongoing basis.

Library systems' usability has also been investigated in the public library domain, with Aitta et al's (2008) heuristic evaluation of 15 public library websites. This Finnish study highlighted a number of usability issues. In particular the use of confusing terminology led to navigation difficulties across the websites, and the use of the same terms in different contexts but with different meanings caused uncertainty. The authors conclude that their experience of carrying out a heuristic evaluation shows that it is a useful starting point for evaluations, but it is not likely to be sufficient when using library professionals as evaluators, as a perspective on the terminology used on the websites is required from a non-professional perspective.

Manzari and Trinidad-Christensen (2006) also used heuristic evaluation, but followed it with task-based usability testing in their study of the development of a library website for a graduate school at Long Island University. The researchers noted that library website usability studies do not usually include a heuristic evaluation despite its recommendation by usability experts. Three evaluators with experience of website design were chosen and made their evaluation based on

Nielsen's ten heuristics. The evaluators agreed that the website used appropriate language, and was well-designed. They also made suggestions for menu changes, and were concerned that some links to other websites might be confusing. Ten postgraduate students took part in the task-based usability testing which involved a series of eight tasks such as finding the library's opening hours, and locating the full text of a particular journal article. The researchers concluded that one of the challenges for developing the website had been finding a balance between a site suitable for new students and one for advanced students, as new students can be unfamiliar with library terminology. They added that usability testing had proved to be worthwhile as some changes to the website had been suggested, and because the testing is *"fairly easy and inexpensive to conduct"*.

An inquiry into the usability of a specialised library website was carried out by Ebenezer (2003) with her usability evaluation of the South London and Maudsley NHS trust library website. The study aimed to discover whether the site was confusing for users, whether it was easy to navigate, if it was visually attractive, and if it was consistent in terms of design and methodology. Methods employed included three focus groups each with three participants, observation of seven participants carrying out tasks, and a card sorting test. The researcher points out that website usability is not always given the priority which it deserves:

> *"The evaluation process tends to be ignored in the production of web pages, but it should be core".*

The results of the study identified problems with some of the specialised terminology used on the website, and also the organisation of some of the information. The relatively small sample size in the observation test may have caused concern, but the author concludes that it did not invalidate the results as later testers tended to identify a high proportion of repeat rather than new problems. She adds that although usability testing can seem to be artificial and has limitations, the research did find significant usability problems with the website.

Remote observation techniques were employed by Thompson (2003), when specialist screen viewer software enabled the observer to be in a separate room

and view the user's interaction with California State University's new library website. This method was selected as the author believes that observing users interacting with a website is the best way to enhance it. It also has the benefits of being more comfortable for participants, as having an observer close-by can be intimidating, and also improving the observer's concentration levels by allowing them to focus on the testing rather than be distracted by the participant in any way. Five student participants took part in the testing, and carried out a set of eight tasks typical to student research. The testing showed that in common with other studies discussed here, participants had problems with library terminology used within the website despite the efforts of librarians at the university to develop clear terms. The researcher concludes that remote observation techniques are less intrusive, and require fewer staff members to carry out a thorough test. It also becomes possible to widen the testing to geographically remote users, and to observe users in their natural environment.

E-books are growing in popularity in libraries. A study of their use in UK universities showed that with more than 60 per cent of the academic population being regular users of e-books they *"would appear to be well embedded as a central part of their information experience"* (Nicholas et al, 2008). However, usability concerns have been raised about them. An early investigation into e-book reader software products indicated issues with portability, readability and navigability. Participants at Loughborough University library and Market Harborough public library were asked to evaluate two types of reader software, and this was done by allowing the participants to use the products with minimal instructions, after which time they completed a brief questionnaire. Glassbook software was installed on laptop computers, while the Rocket e-book reader is a screen tablet the size of a paperback book. At Loughborough University library, 11 female and nine male participants who were a mix of students, academic staff, and administrative staff, evaluated the two types of readers, while at Market Harborough public library, nine reading group members were asked to evaluate the Rocket reader. Both groups of participants showed little enthusiasm for either product with the Rocket reader considered to be too heavy at 22 ounces (or about 625 grams), having too small a screen size, and having screen reflection

problems. The Glassbook software was rated even more negatively. The authors concluded that:

> "...*electronic books have some way to go before they are to become natural to own alongside (or replacing) printed books"*

(Dearnley and McKnight, 2001).

Later research into e-book usability by Kang et al (2009) compared the differences between reading an e-book and a conventional book in terms of levels of eye fatigue. Ten male and ten female student participants aged 16 to 18 years took part in an experiment where they each read a number of novelettes via an e-book and then in a conventional book. This was followed by a number of questions to test their recall of what had just been read, and reading speed, reading accuracy, and eye fatigue levels were measured. The authors found that reading accuracy levels were similar for the two types of books, but reading speed levels were lower and eye fatigue levels significantly higher for e-books. Female participants experienced significantly less eye fatigue than male participants due to them being faster readers in this study.

Anuradha and Usha (2006) highlight the advantages of e-books, these being that they provide multimedia information, allow flexible searches including those of the whole text, give a selection of font types, and can be portable and used on different devices. However their survey of users at the Indian Institute of Science found a lack of interface user-friendliness and concerns about their cost and that of the equipment to read them. Many survey respondents simply found e-books hard to read, and did not want to change the habit of reading conventional books. Similarly a JISC survey of e-book use in UK universities reported that *"There are many users who would prefer hard copies to e-books"*, with the biggest disadvantage being the problem of reading from a screen which can lead to tired eyes and make it difficult to absorb information (Jamali et al, 2009).

A more recent study of e-book use took place at a college in Pennsylvania. Mixed methods of a survey, focus groups, and usage statistics found that students' main concern was reading e-book text from a computer screen. Other concerns included difficulties in downloading the text, whether the e-books could be used on

e-book readers, and high printing costs. Library policy at the college allows for the purchase of only one copy of some key texts, and the availability of these texts in e-book format led to *"significantly higher use than their print counterparts"*. The study's author concluded that although students do have some problems with their use, the replacement of low use items with e-books was a good use of library funds (Rojeski, 2012).

E-book readers are an aspect of mobile technology that is having an influence on university libraries. Mobile telephones and tablet computers are other mobile technologies now becoming ubiquitous in these places, and as a result research is increasingly being carried out in this area.

In 2010 Lippincott believed that we were on *"the verge of a revolutionary phase of mobile device impact on higher education and libraries"* and that the increased use of these devices was going to have implications for libraries both in terms of library space and library services. This would now seem to be the case. The author gave the examples of libraries needing to provide lockers equipped with electric sockets so that mobile devices can be recharged, and there being more open tables as desk space for mobile device use rather than space allocated to desktop computers, and concluded that there would be both challenges and opportunities ahead for libraries:

> *"The challenge for academic libraries is to create compelling information services and to make digital content available in a way that our user community will find not only acceptable, but tailored to their needs"*

(Lippincott, 2010).

Similarly, Nowlan (2013) notes the increasing demand for mobile library services, and highlights the importance of these services:

> *"Providing mobile services allows libraries to stay ahead of the curve and stay relevant in an ever-growing mobile society".*

Paterson and Low (2011) considered the benefits of mobile library services to students at the University of Edinburgh via a survey and focus groups. A total of 1716 students completed the survey, and 11 took part in the focus group sessions. At the time of the study, the university library did not have services for mobile

devices, and the study aimed to explore student attitudes towards this provision. The results showed a strong desire amongst participants for the mobile services, and the researchers concluded that user research and usability testing would be essential in order to ensure that that easy-to-use and intuitive services are provided.

More recently, the availability of mobile services in university libraries has been criticised. Bomhold (2014) surveyed the mobile provision of a number of academic libraries in the USA. A total of 73 library websites were investigated to ascertain whether the websites had been optimised for mobile access, and to investigate what type of content was offered. The author concluded that while *"tremendous strides"* had been made in mobile academic library services since a previous similar study was carried out in 2010, thirty per cent of the libraries which were considered as being *"very high research"* institutions did not have a mobile presence. Furthermore, only two of the libraries surveyed offered what the researcher considered to be a full complement of services tailored for mobile device use. It is also noted that usability and not just content has a major role to play in these types of sites, and that user needs to be at the centre of the services offered:

> *"The services that are offered have no prevalent predictability, and in the rush to be mobile libraries seemingly have lost sight of the user* ".

Wisnieswski (2011) agrees that the usability of mobile library services is vital and believes that usability must be considered throughout the entire design process. He adds:

> *"...interacting with the small screen poses challenges that working with a larger screen does not".*

The challenges include being able to minimise the amount of text entered onto a small screen, and keeping to conventional user interface guidelines.

Researchers at Portland State University library in the USA tested the usability of their mobile website with 12 student participants, with a variety of mobile telephones (smartphones): Apple iPhones, and a selection of Android, Blackberry

and Windows smartphones. Participants were given a number of library-related tasks to carry out, such as searching the catalogue, and using a library vendor-supplied database. The findings highlight the importance of carrying out usability testing with different types of smartphone, as the type used can impact the user experience of using mobile services. However, developer awareness of usability issues is one way of overcoming these issues (Pendell and Bowman, 2012).

Some university libraries still do not offer a mobile website, and a study in Croatia (Pazur, 2014) investigated whether users feel that they need this facility. Users at the Rudjer Boskovic Institute in Zagreb responded to a questionnaire which aimed to investigate whether a mobile library website was required. A total of 240 users participated, with 64 per cent of participants stating that they were in favour of such a website, a figure which the author believes should be taken into account when the library considers its mobile services. Once again, this study noted the importance of usability testing with the author stating its importance in a mobile environment in order to find and eliminate the problems that users may encounter.

While it is essential to support users in their use of mobile devices, this can only be achieved if library staff have the confidence to be able to do this. The University of Glasgow library found that staff did not feel confident about operating in the mobile environment, and as a result a staff training programme was introduced. The programme focused on mobile technology in general, although the library's initiatives were highlighted, with the aim "*to support the ever-increasing number of mobile users"*. The course has helped the library staff to make a contribution to the development of mobile services, and also to support the library's mobile users (Munro and Stevenson, 2013).

Library usability studies have tended to concentrate on digital aspects, but Stelmaszewska and Blandford (2004) believe that by achieving a better understanding of how users interact with information in a physical library, design improvements to digital libraries can be made. Fourteen computer science students were recruited and asked to find materials relevant to their studies, and to think aloud while they did so. The study showed how users use the physical library, and highlighted that whereas users can feel overwhelmed by the sheer

quantity of information in digital libraries, physical library collections are much more manageable. It is also straightforward to ask for help in a physical library as users simply ask a member of library staff, and additionally physical libraries offer a familiar environment as the different areas give cues about the type of information offered there. The researchers conclude that digital libraries cannot simply mimic physical libraries as the user experience differs so greatly between the two and cannot easily be transferred.

2.5 Socio-technical theory

Library usability studies have highlighted usability issues within libraries. However, Dillon (2001) argues that while usability of systems is important, it is not always sufficient, and that users will only adapt to new systems and technologies if their work is enhanced by doing so. This wider view is based on socio-technical theory which is discussed in depth by Eason (1988, p.46). He states that the goal of designing a system must be to produce a socio-technical system which meets the goals of the organisation, and not simply to produce a technical system which produces a technical service. He asserts:

> *"If the technical system design is treated separately from organisation issues the result may be a splendid system that may not serve its users".*

Petre et al's (2006) investigation into the total customer experience of e-commerce shoppers highlights this when it stresses the importance of thinking beyond just the web interfaces of a system to include other factors such as the delivery of the products or post-sales support. Customers have high expectations in these areas and if disappointed will not return to the website for further purchases, however usable it is. Socio-technical systems research has also taken place in the domains of bus information panels at bus stops (Reed & Wright, 2006), home support systems for the elderly and disabled (Sommerville & Dewsbury, 2007), and enabling Kenyan farmers to use technology to assist with their information needs (Camara & Abdelnour-Nocera, 2010).

On a serious note, Richardson, (1994) discusses how the 1980s and 1990s saw a number of socio-technical disasters in the UK and worldwide, and he cites Bhopal,

Chernobyl, Challenger, Exxon, Zeebrugge, King's Cross, Kegworth, Hillsborough and Lockerbie. They are described as socio-technical disasters because they *"unfold through complex technological, organizational and social processes*", have common characteristics, and occur when there is a breakdown in human, organisational and technological systems, or a combination of the three. Usually there is an incurrence of huge economic and social costs associated with them, along with large-scale damage to human life. In another study, this of the 2011 Fukushima nuclear plant disaster which followed the Japanese tsunami, it is argued that it is not possible to separate the social from the technical in a large complex system like a nuclear power plant. The fact that it is a socio-technical system which can be affected by factors such as those involving political decisions needs to be taken into account when creating models for system safety (Pfotenhauer, 2012).

O'Day and Nardi (2003) build on socio-technical theory to establish the concept of information ecologies. They define these as:

> *"...systems of people, technologies, practices and values".*

They give the example of a doctor's surgery as an information ecology, where the people are the doctors, nurses, administrative staff and patients, the technologies are the medical and accounting tools used, the practices include the treatments, scheduling of appointments and other administrative procedures, while the values are to provide a high-quality level of healthcare.

The authors also describe a library as an information ecology, and give an in-depth account of the search process for library items and the people, technologies, practices and values involved. Figure 2 summarises their account:

People	Technologies	Practices	Values
Librarians Library users	Internet Specialised databases CD-ROMs	Reference interviews Searches for items (librarians and users)	Providing an information service

Fig.2 The library as an information ecology

The notion of a gap between technology and users is emphasised in this research, and usability testing is one of the user-centred methods that the authors believe can attempt to bridge this gap. Ackerman (2000) also discusses socio-technical gaps which he describes as:

> "...*the great divide between what we know we must support socially and what we can support technically".*

He adds that building technical systems to support the social world can be a challenge, and that while attempts have been made by researchers and information technology (IT) professionals to bridge the gap, it remains wide.

In another analysis, Nardi and O'Day (1999) discuss how a library shows the diversity of information ecologies with human and technical resources working together in co-ordination rather than competition. Instead of predicting the decline of the library, they see the increase in online information as an opportunity to take advantage of the skills of librarians so that libraries remain important and useful places.

García-Marco (2011) believes the use of the concept of information ecologies in libraries means looking at the information world as a whole system, and states that information ecologies can be:

> *"...used as a tool to understand a complex social information landscape, where professions, approaches, perspectives etc. compete and collaborate in an ever-changing environment".*

Showers (2012) also emphasises the ever-changing nature of academic libraries when he comments how the use of the internet has changed the expectations of

library users which in turn means that libraries need to make radical changes to how they distribute information. He believes the emerging library information ecology is one where data drives library systems and they become more agile as a result.

Another piece of research that considers information ecologies is a study of the usability of London transport systems. Inglesant and Sasse (2007) investigated the experiences of users of three London Transport systems – the Oystercard, the Congestion Charge, and the Transport for London Journey Planner. Interviews with staff and users, and focus groups with users were carried out, along with observation of user activities and analysis of documents. The researchers found usability problems but discuss how *"mundane contingencies of daily life combine with technological systems in the lived experiences of transport users"*, with these lived experiences forming information ecologies. As an example they recount a Congestion Charge user who returned home at 9.30pm, relaxed and had a glass of wine, forgot to pay the charge, and thus incurred a large fine (in 2005 when this research took place, users had to go online and pay the charge the same day), and similarly an Oystercard user who describes how *"secret sort of amounts"* are deducted from the card when it is used to purchase a bus trip or tube train journey. A point of interest in this research is that it also considers whether usability should be considered in policy design. The researchers note that:

> *"Underlying much e-government policy is an implicit assumption that it is sufficient for services to be provided in ways which are more cost effective, information more readily available and more timely, and access to services faster and easier".*

Taking this view does not take users' lived experiences with the systems into consideration, and the authors also observe that not doing so may mean that policies to encourage particular user behaviour, such as the use of public transport, may not succeed. In conclusion the research emphasises the need for system usability to be considered and made a priority at the policy design stage and prior to a system's implementation. It should not be *"something the system implementer will take care of"*. If this is not done, systems can fail to meet users' needs.

2.6 Library policies

Other authors have also investigated the importance of policies that concern usability. Ackerman's (2000) discussion of socio-technical gaps states that policies need to be *"flexible, nuanced and contextualized"* to support human activities in systems. Lazar et al (2005) discuss how government policies can have a large impact on the work of web and other interface designers. For example government information must be usable for all sectors of the community whether young, old, or having disabilities. A study of how the provision of real-time information for bus users improved the usability of the transport system for bus travellers in Washington state, examines how this provision led to an increase in the number of journeys made, an important point for policy makers trying to increase the usage of public transport (Ferris et al, 2010).

Policies can be defined as:

> *"...rules or guidelines that express the limits within which action should occur*"

(Mintzberg and Quinn, 1996, p.4).

However it was also noted by Cunningham, a former senior British civil servant that:

> "*Policy is rather like an elephant – you recognise it when you see it but cannot easily define it"*

(Cunningham, 1963, cited in Hill, 2005, p.7).

Colebatch (1998, p.6) believes that a policy can be simply "*This is the way we do it here".* The author goes onto say that there are five stages of policy process. Firstly the goals are determined. Secondly the courses of action to meet these goals are chosen. Then the courses of action are implemented, and following this the results of the action are evaluated. Finally the policy is modified if required (Colebatch, 1998, p.43).

In common with government bodies, other businesses and institutions, university libraries will also have policies to guide users and staff. These will cover areas such as circulation i.e. loan lengths and fines for exceeding these, collection

development, user behaviour or conduct, and also computer use. There may also be policies which have the implicit aim of improving users' experiences. By having a user experience policy, libraries can make a pledge to their users to make their library and its systems as usable as possible and to do this on an ongoing and regularly reviewed basis.

Wu and Lanclos' (2011) ethnographic study of the re-design of a university library website and the first floor layout of the library building, explains that the hiring of a new university librarian led to a change in library policy with:

> *"...an intent to re-orient the physical and virtual library environments to the educational needs and expectations of users".*

The authors assert that ethnography and usability can be driving forces in library policy so that decisions are no longer made in a top-down manner by library managers, but *"diffuse upwards"* from the needs and work requirements of library users.

Crawford (2005) believes that while there has always been an interaction between technology and policy in libraries, the interaction has become more complex, and asks:

> *"Why should you care about policy when your real concern is technology?".*

The author argues that library technology should be considered in a policy framework in libraries for a number of reasons: it shouldn't be assumed that the addition of a new technology in a library will mean that nothing else will change as a result, there will always be unplanned and unintended effects from new technology, and the new technology may fix some problems but is likely to cause new ones.

Research by Ngimwa and Adams (2011) investigated the role of policies in digital library design. The researchers were motivated by their belief that:

> *"...the impact of national and institutional policies on the design process of digital libraries is not fully understood".*

Case studies at three African universities showed how policies can support the design of digital libraries by encouraging collaboration between stakeholders or even enforce it by making some tasks compulsory. Policies acted as catalysts for initiating projects for example by a *"trickle down"* effect from government level to the institutional level, or by influencing funding decisions. They also encouraged innovation and creativity, and collaboration between different groups such as academics, librarians and students. However, when a university's strategic plan did not link with national policies regarding development of electronic resources, the system developed was poor and did not meet the requirements of its users. In conclusion the authors argue that national and institutional policies were a *"powerful force"* which established how successful the design process was, and that developers of digital libraries need to be involved in the policy making process by helping to develop policies and also by giving feedback about their effectiveness.

Chen et al (2009) also argue the case for formalised library policies, and note that while there are many library usability studies especially concerning library websites, there is very little research on web usability policies, standards and guidelines. Their survey of the academic libraries that constitute the Association of Research Libraries in the USA, showed that 30 per cent of survey respondents have policies, standards, and guidelines in place regarding website usability. The researchers believe that while many of the libraries have usability procedures that they follow, they should also have a written policy along with standards and guidelines. These would serve as resources for information within the particular institution, and for the whole library community.

3. Problem Statement & Research Questions

Following on from the Literature Review, this chapter discusses the research problem, and proposes the problem statement and research questions.

3.1 Discussion

UK universities are undergoing changes under the combined influences of increased fees for students and government spending cuts. The latter will inevitably impact the services offered by university libraries, but there are bodies such as the British Library and SCONUL who support and make the case for university libraries in the ongoing difficult financial times. There are also innovative projects taking place at university libraries such as the collaboration between the University of Worcester and Worcestershire County Council as they provide a combined public and university library service, the first of its kind in Europe.

University applications are currently at record levels despite the increased cost of tuition fees, and it would seem that student numbers are set to increase in future years. The UK student population is large at approximately 2.25 million, and research studies in higher education are consequently beneficial to those involved in this sector.

Library user experience studies have long been a popular and valuable way of gauging users' opinions of library services both in the physical and digital realms, with issues such as library anxiety, problems with searching and locating items, and the quality of interactions with library staff being highlighted. Recently both a new conference and a new journal in the field of library user experience have been launched, showing the importance of the topic at the current time. In the 1990s Andrews' (1991) study of the usability of an academic library highlighted the fact that these places were considered by some to be *"virtually unusable".* The study emphasised library users' concerns and their anxieties about using the library.

Other user experience studies have shown that students are keen to have libraries that create an inviting environment for them. They are places students go to for a number of study-related reasons such as book borrowing or quiet reading, or for reasons not related to study, for example to socialise, read for pleasure, or simply

to have a rest. Library refurbishment projects in recent years have proved popular amongst library users, and these types of projects are an opportunity for the digital and physical aspects of university libraries to be considered in conjunction with each other, as each have a part to play and will contribute to the overall user experience.

Technological advances are also taking place in university libraries, and there has been a corresponding increase interest in library usability studies. Many of these studies have taken place in the recent past, with researchers stressing the importance of usability testing to libraries. It can pinpoint many types of problems within an interface, yet can be fairly easy and inexpensive to carry out.

Library usability studies have tended to concentrate on a few areas: the re-design of library websites has proved to be a popular theme and these have highlighted problems with library terminology and jargon. Other studies have shown that the use of e-books can be problematic as reading from a screen can cause eye fatigue. However, many library staff believe that e-books will become increasingly important in university libraries, and additionally there are growing numbers of distance learners at UK universities, people who find it difficult to attend their university library, and so will rely on digital resources such as e-books for their studies.

The increasing use of mobile devices is also having an impact on university library services, and this is an area where a great deal of research is now being centred. Studies have shown the implications of this for university libraries as students embrace the latest technologies such as smartphones and tablet computers, and researchers have emphasised the need for usability awareness with mobile library services.

Some library usability researchers have attempted to standardise the measurement of usability with tools such as questionnaires that measure the gap between users' experiences and their expectations of the usability of systems. It has however been argued that usability alone is not a sufficient measure of a system, and that socio-technical factors have a large part to play too. The gap

between users and technology, and how this gap can be bridged has been considered. Researchers have investigated many types of systems, including libraries, from socio-technical viewpoints, and the concept of a library as an information ecology of people, technologies, practices and values has also been discussed. When taking a socio-technical stance in the study of systems, it has been shown that policies have a part to play. Libraries are likely to have a number of policies in place, but a study by Chen et al (2009) revealed that relatively few will have a website usability policy.

3.2 Bridging the gap

It can be argued that there will always be a gap between what a library provides for users and what users hope to achieve by using a library. This is because the library managers (or budget holders) and its users have different expectations.

Figure 3 shows the differences between some of the expectations of users compared with those of the library managers in terms of the physical library i.e. the library building, and the virtual library i.e. the computerised library systems.

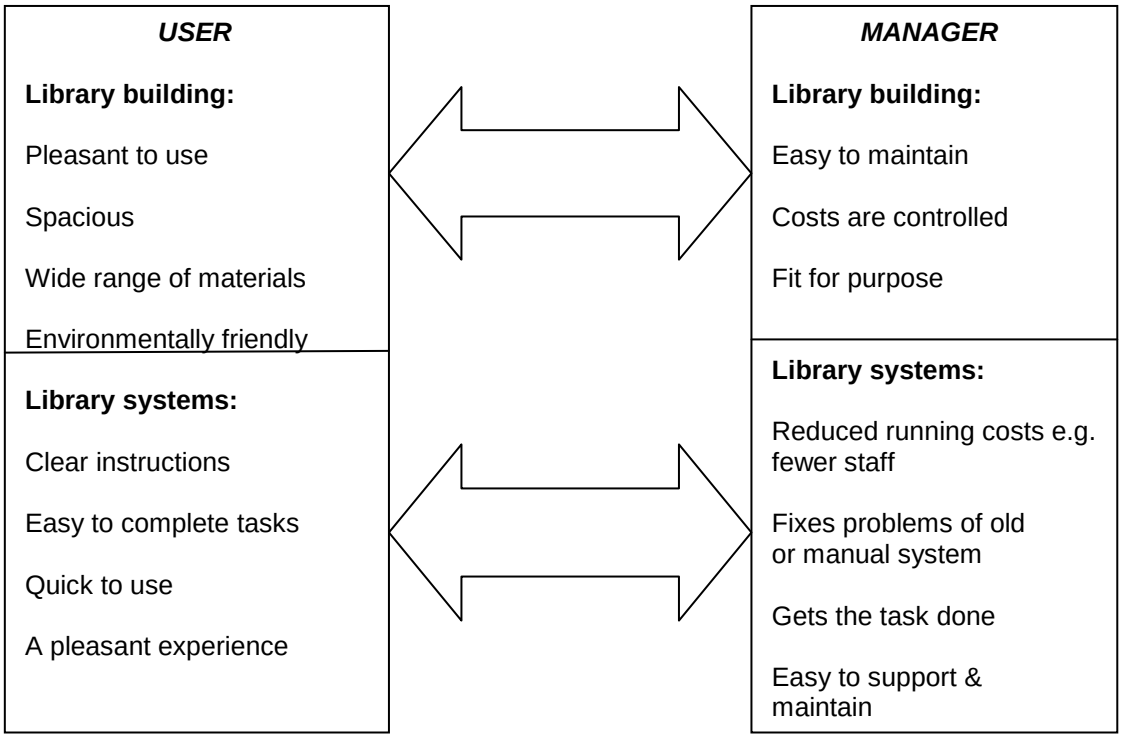

Fig. 3 The differences between user and library manager expectations.

While library users may expect a library building which is spacious, environmentally friendly, with a wide range of materials, and which overall can be described as pleasant to use, library managers may have different goals such as having an easy to maintain building where costs can be controlled, and which overall can be considered as fit for purpose.

Similarly, library users may expect a library system with clear instructions and which is quick to use, meaning that tasks are easy to complete. However, the managers hope it will fix the problems associated with the system it is replacing whether computerised or manual, that savings can be made in terms of reduced running costs such as having fewer staff members, that it is easy to support and maintain, or that it simply gets the task done.

The notion of bridging gaps has occurred in a number of studies and discussions. Ackerman (2000) is concerned that despite attempts to bridge it, the gap between people and technology is wide, while O'Day and Nardi (2003) believe that usability testing can help to bridge this gap. Sadeh (2007) highlights the gap between what the library offers its users and what they expect in return.

In a similar vein, Koohang (2004) devised a questionnaire to measure the gap between users' experience of the usability of digital libraries and their expectations of it, and Inglesant and Sasse's (2007) research into London's transport system looked at the gap between users' *"lived experiences"* and their expectations of using the systems. This latter study sees policies as a way of bridging the gap: rather than responding to users' problems with a system once they have given negative feedback, thought should be given to usability and user experience issues at the design stage via policies in this area.

3.3 Definition of the problem statement

It can been seen from these studies and discussions that the concept of gaps between users' experience and their expectations features strongly in user research. Bridging these gaps is important in order to create a good user experience and ideally needs to be considered in the early stages of the design of

a system. However this does not always happen, and sometimes the gap has to be measured for an existing system so that improvements can be made.

The university library is an existing socio-technical system, and this study aims to measure the gap between users' experiences of using the library and their expectations of how it should perform.

University library policies also have a role in user experience and the existence of a policy in this area can change user experience from a vague concept into a firm decision to make usability and overall user experience a priority. This study will explore university policies such as those concerning website usability, to investigate how they could bridge the experience/expectations gap.

The problem statement for this study is as follows:

To carry out an exploratory study into the gap between users' experience and expectations of using the university library, and to investigate how library user experience policy can bridge this gap.

3.4 The research questions

The main research questions that this study will attempt to answer are:

How do library users rate the usability of their university library and its systems?

How big is the gap between users' experience and expectations of using their university library and its systems?

Which type of policies do UK university libraries have, and do they have user experience or usability policies?

How can a user experience policy bridge the gap between users' experience and expectations of using their university library and its systems?

4. Methodology

4.1 Introduction

This chapter considers the methodology and methods to be used for this study and the reasons for their selection.

The review of the literature showed how user experience has been studied in university libraries. It also showed how library usability testing has come to the fore in recent years as university library staff have worked to improve library systems and interfaces, as a step towards creating a better library user experience. This testing has involved an assortment of approaches.

Usability testing tends to blend a mixture of qualitative and quantitative methods such as heuristic evaluation, focus groups or interviews with users, task-based tests, and user questionnaires. Studies in the library domain have utilised these methods, with some researchers concentrating on one method and some using two or more, such as task-based testing followed by a questionnaire. When undertaking research in libraries the choice of research method should be based on "*best fit for purpose"* (Pickard, 2013, p.127).

Dawson (2009, p.16) believes that while quantitative and qualitative research have their strengths and weaknesses, neither one is better than the other, and the skills, training and experience of the researcher need to be taken into account when deciding which of the two paths to follow. Additionally, researchers should follow their instincts and carry out the research they are more comfortable with, as this will help to keep motivation levels high.

The difference between quantitative and qualitative data is explained by David and Sutton (2004, p.35). They describe quantitative data as that which:

> *"…refers to things that have been or which can be counted and put on a numerical scale of some kind".*

In contrast, qualitative data is that which:

> *"…refers to the collection of materials in a linguistic form, a form that has not been translated into a location on a numerical scale".*

Kumar (2014, p.132-3) discusses qualitative research in terms of its flexibility giving researchers the chance to explain, explore, discover and clarify situations, attitudes or experiences. There is often less structure than with quantitative studies, allowing methods and processes to evolve. However, quantitative research with its controlled approach has the advantage of allowing for the replication of the research that has taken place (Burns, 2000, p.5).

This study is exploratory in nature. Gray (2009, p.35) defines exploratory studies as those which:

> *"…seek to explore what is happening and to ask questions about it".*

The author adds that they are useful when not enough is known about a phenomenon, and that they can help to decide whether the subject is worth further research.

4.2 Choice of methods

There are four research questions to be answered, and in order to do this data is required from library users i.e. students, academic staff or others. Data regarding university library policies also needs to be gathered. The research questions are:

How do library users rate the usability of their university library and its systems?

How big is the gap between users' experience and expectations of using their university library and its systems?

Which type of policies do UK university libraries have, and do they have user experience or usability policies?

How can a user experience policy bridge the gap between users' experience and expectations of using their university library and its systems?

There are a number of methods that can be considered in order to answer these questions.

4.2.1 Interviews

Interviewing is a flexible research method, and probably the most widely used in qualitative research (Bryman, 2008, p.436). May (2001, p.120) describes the value of interviewing as a research method:

> *"Interviews yield rich insights into people's biographies, experiences, opinions, values, aspirations, attitudes and feelings".*

The author specifies that there are broadly four types of interviews: the structured interview, the semi-structured interview, the unstructured interview, and the group interview.

A structured interview differs from an interview-based questionnaire in that it has more open-response questions. Structured interviews have a set of predetermined questions with fixed wording (Robson, 2011, p.279). The advantage of using this type of interviewing is that it allows responses to be compared and generalisations to be made from statistically representative samples (May, 2001, p.122).

Bernard and Ryan (2010, p.29) emphasise the difference between structured and semi-structured interviews:

> *"In semistructured interviews, each informant is asked a set of similar questions. In structured interviews, each informant is asked a set of identical questions".*

They go on to say that semi-structured interviews are based on an interview guide which is a list of questions and topics to be covered. The interviewer asks the questions and uses probes to gather further information.

In unstructured interviews there may be just one question asked by the interviewer, with the interviewee responding freely. The interviewer may then follow up particular points (Bryman, 2008, p.438).

The group interview or focus group is discussed in the next section (4.2.2).

Interviews are used for a number of reasons. Firstly they allow for the collection of in-depth data as the interviewer can probe for more information. They are also appropriate in situations where interviewers can explain complex questions or prepare respondents for sensitive topics. Another advantage is that an interviewer can supplement the information gained with observation of non-verbal reactions. Finally, they can be used with many types of populations from children, to the disabled and the elderly (Kumar, 2014, p.182).

There are also disadvantages to their use. They can be time-consuming to prepare, to carry out, to write up notes, to transcribe if necessary, and to analyse (Robson, 2011, p.281). Secondly, the quality of the data collected will depend upon the interaction between the interviewer and interviewee, and also on the experience and skills of the interviewer. Finally there is the possibility of researcher bias, either in the framing of the questions, or in the interpretation of responses (Kumar, 2014, p.183).

For this study, interviews with library users could be undertaken in order to learn how they rate their experience and expectations of using the library. Similarly, interviews with library staff could be carried out in order to ascertain which type of policies are in place in university libraries.

4.2.2 Focus groups

Walliman (2006, p.98) defines focus groups as:

> *"...a type of group interview, which concentrates in-depth on a particular theme or topic with an element of interaction".*

The aim of a focus group is to have a free-flowing discussion which is also useful and interesting, with the participants having a common bond which allows them to feel comfortable talking to each other in a group situation (Dawson, 2009, p.85). They can be used in the early stages of research to explore a particular topic, to explore issues in more depth as research progresses, or to confirm emerging findings as the last element of data collection (Pickard, 2013, p. 244). Focus groups tend to range in size from six to 12 members (Robson, 2011, p.295).

Advantages of focus groups include the fact that they are an efficient way of collecting a wide range and large amount of data as it is collected from several people at one time. They are also relatively inexpensive, and can be set up in a short amount of time. There are however some disadvantages. For example there may be issues with confidentiality between participants in a group situation. Group dynamics can also be a problem, and the less articulate may not share their views or the discussion may become dominated by one or two people (Robson, 2011, p.294-5). Pickard (2013, p. 243) emphasises the fact that being a focus group moderator can be difficult, adding:

> *"This technique is not usually recommended to new, inexperienced researchers as it demands a relatively high level of understanding".*

This study would lend itself to the use of focus groups in a similar way to the use of interviews: focus groups with library users could be undertaken in order to learn how they rate their experience and expectations of using the library, and focus groups with library staff could be carried out in order to ascertain which type of policies are in place in university libraries.

4.2.3 Think aloud protocol

Think aloud protocol is a research method used in usability testing. Lewis (1982, cited by Nielsen, 1993, p. 195) gives the following definition of it:

> "*...a thinking aloud test involves having a test subject use the system while continuously thinking out loud".*

This research method is more usual in formative user testing rather than summative, as the collection of quantitative metrics can be hindered by the fact that the participant stops to talk and therefore their task time is interrupted (Lazar et al, 2010, p.273).

The main advantage of think aloud protocol is that it allows researchers to understand how users view a system and thus to identify their main misconceptions. However, while an abundance of qualitative data can be collected, it is a method which is not particularly suited to performance measurement (Nielsen, 1993, p.195).

Think aloud protocol could be considered for this study as a way of measuring users' opinions of their university library and its systems. Instead of looking only at user interfaces, users could be asked to walk around the library and talk about different aspects of it for example what they like and dislike.

4.2.4 Surveys and questionnaires

Surveys are often used in exploratory studies, and allow for the collection of large amounts of data in a highly economical way (Saunders et al, 2007, p.138). They can take the form of observational surveys, diaries which are completed by participants, or questionnaires. The last-named of these can be self-completed, completed by an interviewer (or researcher), distributed by post, or carried out by telephone (Robson, 2002, p.228-9). They are now also commonly distributed and returned via e-mail.

It has been noted that questionnaires are the most popular data collection tool, but also that the response rate can be low unless the researcher administers them personally. This also overcomes the problem of the participant not understanding any part of the questionnaire, as the researcher is there to provide additional information (Pickard, 2013, p.208). The presence of the researcher can also actively encourage the participant's involvement. While self-completed questionnaires can be sent out by post or e-mail and are therefore cheaper to administer, they may not be returned promptly if at all, and additionally there is the

problem of partially answered questionnaires or skipped questions (Bryman, 2008, p.217-9). It is also impossible to know who actually completed a particular questionnaire if it is filled in out of the researcher's sight (Rugg and Petre, 2007, p.145). However, there are still potential problems with researcher-administered questionnaires, and Robson (2002, p.234) points out there may unwittingly be bias from the researcher in the form of verbal and non-verbal cues, or that participants may be concerned about the anonymity of their answers, and are therefore less forthcoming. There is also the disadvantage of the time it takes to administer a questionnaire in this way, and the fact that potentially many different locations need to be visited by researchers to complete the survey (Walliman, 2006, p.88).

Sampling is an important consideration when carrying out a questionnaire survey. Pickard (2013, p.59) discusses the problems regarding sampling facing researchers and states:

> *"...it may well be much more informative to study the entire population but this would almost always be impossible based on cost and time".*

Therefore sampling strategies are required and these fall under two categories. Probability sampling includes simple random sampling along with systematic, simple stratified, proportional stratified, cluster and multi-stage sampling. The alternative is non-probability sampling which can be accidental (or convenience), quota, theoretical, purposive, systematic matching or snowball sampling (Walliman, 2006, p.76-79).

Rugg and Petre (2007, p.68) discuss sample size and how there is *"a widespread but erroneous belief"* that a sample size should be as large as possible. They think it simply needs to be as large as is necessary for a particular study, because going beyond that number is a waste of resources including the researcher's time and that of others involved in the study. Statisticians have shown that a sample size of at least 30 is required for the sample to be considered valid (Saunders et al, 2007, p.211, Walliman, 2006, p.80).

This study could make use of surveys to discover library users' opinions on the usability of their library, and also to find out which types of policies university libraries have in place.

4.2.5 Methods for this study

The researcher decided that a primarily quantitative approach will be taken for this study. This is for a number of reasons. Firstly as discussed, researchers need to feel confident with the methods they use. The researcher believes that a quantitative approach suits her background as she prefers a logical, structured approach, and likes working with numbers. Secondly, she also feels more confident and comfortable with this type of research, and has experience of carrying out quantitative research previously, and surveys in particular. Authors have noted that methods such as focus groups require skill and prior experience in order to be carried out successfully. Finally, surveys can be more engaging for audiences:

> *"Surveys provide the sort of data which are not difficult for an intelligent lay audience to understand"*

(Robson, 2011, p.240).

There will however also be a qualitative element in this study in the form of open-ended questions within the surveys and content analysis of information. This will add more depth to the survey analysis, and will allow the researcher an opportunity to improve her skills in qualitative research methods. Bernard and Ryan (2010, p.34) suggest that open-ended questions will provide more data and are *"less boring"* than closed questions but point out that that analysing them can be a labour-intensive task.

4.3 User survey

The first two of the four research questions are:

How do library users rate the usability of their university library and its systems?

How big is the gap between users' experience and expectations of using their university library and its systems?

In order to answer these questions, a survey of library user opinions via a questionnaire was carried out.

4.3.1 Selecting the libraries

Instead of collecting data from one university library or from students across a wide range of institutions, the researcher decided to select three university libraries to survey.

In order to select these libraries for the user survey, a preliminary study of university libraries was undertaken. This preliminary study had two aims: firstly to help the researcher to identify a suitable range of libraries to research, and secondly to deepen the researcher's knowledge and experience of university libraries in preparation for this study. A total of eight libraries were visited at UK universities between November 2009 and August 2010, with these being:

- Brunel University
- Royal Holloway, University of London
- Bucks New University
- The University of Reading
- Kingston University
- St Mary's University College
- Middlesex University
- The University of Surrey

All of these institutions are within a thirty mile radius of the researcher's home, as ease of access and the costs of travel had to be taken into consideration.

Staff and students at UK universities are able to visit other university libraries by presenting a membership card from a SCONUL scheme which allows visiting and borrowing rights. The scheme is particularly useful for postgraduate and research

students, but can also be of use to undergraduates when for example they return home during vacations.

The universities visited in this study varied greatly in terms of age and tradition, size, and type of institution. There were consequently large differences between the libraries in terms of design and layout, and facilities. Areas where there were similarities between the libraries included the issue and information desks, provision of PCs, and study areas. There were differences in access to the libraries, decor and furnishings, and food and drink provision.

Following this preliminary study, the researcher was able to consider which of the universities could be approached to see whether they would be willing to be part of this study. However, other opportunities also arose. The head of library services at Cranfield University (CU) was introduced to the researcher by her supervisor, and as a result of discussions CU became a survey site. CU is an institution which is different to the majority of UK universities as it is for postgraduate students only. This fact led to the researcher making the decision to select a range of university types for the study, as having three different types should add more range, depth and interest than if similar types were investigated.

As the researcher is studying at the University of West London (UoWL), a “new university” (universities that were created post-1992 which were formerly colleges of higher education or polytechnics), she approached the manager of the library who agreed to allowing the research. For the third site, the researcher decided that an older or more traditional university was required. Royal Holloway College, part of the University of London, was approached but declined due to the fact that it was carrying out its own survey research at the time. The University of Surrey (UoS) was then contacted and following a meeting at the library at the Guildford campus, library managers agreed to the research. The researcher felt that Royal Holloway College and UoS were suitable to be the third site because they are both older, more established universities yet their libraries had both undergone recent, significant refurbishments.

The sampling frame for selecting the survey sites can be described as a purposive sample, which is described by Sarantakos (2005, p.164) as occurring when:

> *"…the researchers purposely choose subjects who in their opinion are relevant to the project. The choice of respondents is guided by the judgement of the investigator".*

Kumar (2014, p.244) notes that with purposive sampling, the researcher uses their own judgement to decide who can provide the best information in order to achieve the objectives of the study. Furthermore, Aldridge and Levine (2001, p.80) explain that purposive sampling is often used in exploratory studies, and it has been noted that it is more suited to studies where the authors are not attempting to make generalisations from the results (Dawson, 2009, p.53, Rugg and Petre, 2007, p.70). Gray (2009, p.153) stresses that the disadvantage of purposive sampling is that the researcher may subconsciously be biased when selecting the sample.

In the view of the researcher, purposive sampling is suitable for this part of the study because three different types of universities were selected following on from visits to a number of libraries. The opportunity to have Cranfield University as a survey site arose, but this fitted in with the plan to have different types as uniquely in the UK it is a solely postgraduate institution.

The three survey sites were therefore the University of West London (UoWL), Cranfield University (CU), and the University of Surrey (UoS).

4.3.2 The University of West London

The university was founded as the Lady Byron School in 1860, and was formed from the merger of Ealing College of Higher Education, Thames Valley College of Higher Education, the London College of Music and Queen Charlotte's College of Health Care Studies. This new entity was inaugurated as the Polytechnic of West London in 1991, and in 1992 it received full university status and became Thames Valley University (TVU). In April 2011 TVU changed its name to the University of West London (UoWL, 2015a).

In 2015, UoWL is graded as number 94 (out of 119) in the Guardian newspaper's UK university rankings (The Guardian, 2015), while "The Complete University Guide" ranks it as 108 (out of 126) (Complete University Guide, 2015a). In academic year 2012-13 there were approximately 8,500 students enrolled at the university (UoWL, 2015b).

UoWL is based across 3 sites in Ealing and Brentford in West London, with a small hub in Berkshire. There are schools in eight subject areas at the university. These are:

- Ealing Law School
- London School of Film, Media and Design
- London College of Music
- College of Nursing, Midwifery and Healthcare
- London School of Hospitality and Tourism
- School of Computing and Technology
- School of Psychology, Social Work and Human Sciences
- The Claude Littner Business School

(UoWL, 2015c).

UoWL has two library sites – Ealing and Brentford. This study concentrated on the Ealing site due it having students from a wider range of subject areas.

4.3.3 Cranfield University

The College of Aeronautics was the forerunner of Cranfield University. This institution was created in 1946, based at the RAF station in Cranfield, Bedfordshire. In 1969, the college became The Cranfield Institute of Technology with full degree-awarding powers, and new departments were created in new subject areas such as the Cranfield School of Management.

The last thirty years have seen further growth in the university, including an academic partnership with the Defence College of Management and Technology

at Shrivenham in Wiltshire. CU is now the largest centre in Europe for applied research, development and design (CU, 2015a).

CU is a postgraduate institution, specialising in eight main subject fields:

- Aerospace
- Agrifood
- Defence and secuity
- Energy
- Environment Technology
- Leadership and management
- Manufacturing
- Transport systems

(CU, 2015b).

There are two libraries at CU – one on the main Cranfield campus and the other in Shrivenham in Wiltshire (CU, 2015c). This study concentrated on the main Cranfield site in Bedfordshire.

As CU is a postgraduate institution, it is not usually included in the university league tables. However, CU is at 45th place in the Financial Times Global MBA rankings 2015 (Financial Times, 2015). There were approximately 4,500 students at CU in academic year 2014-15 (CU, 2015d).

4.3.4 University of Surrey

The University of Surrey was established in 1966 but its roots go back to the late 19th century when the Battersea Polytechnic Institute was founded in 1891, and first admitted students in 1894. It began concentrating on science and technology from about 1920 and it was renamed Battersea College of Technology in 1957. In 1962, the college having outgrown its Battersea site, moved to Guildford in Surrey. Shortly afterwards it became a university (UoS, 2015a).

There are four subject faculties at the university:

- Faculty of Arts and Human Sciences
- Faculty of Business, Economics and Law
- Faculty of Engineering and Physical Sciences
- Faculty of Health and Medical Sciences

(UoS, 2015b).

In 2015, UoS is graded as number 4 (out of 119) in the Guardian newspaper's UK university rankings (The Guardian, 2015), while "The Complete University Guide" ranks it as 8th (out of 126) (Complete University Guide, 2015a). There were approximately 14,000 students enrolled at the university in the academic year 2013-14 (Complete University Guide, 2015b).

4.3.5 The libraries as case studies

It could be argued that the three libraries selected as survey sites could also be separate cases within a multiple case study. Yin (2009, p.18) defines a case study as:

> *"… an empirical enquiry that investigates a contemporary phenomenon in depth and within its real-life context".*

The author believes that case study research is suitable when "how" or "why" questions are being asked, and that "how many" or "how much" type questions favour the use of survey methods (Yin, 2009, p.9). Although the research questions for this part of the study are "how" questions, they are in fact "how many" or "how much" questions because they are trying to quantify library users' opinions of using their university library. Therefore the researcher believes that a survey is more suitable for this part of the study.

Many authors emphasise the holistic nature of case study research (Pickard 2013, p.102, Robson 2011, p.136, O'Leary 2005, p.150), and similarly Oates (2006, p.141) describes how case studies aim to obtain a detailed insight into the life of a case and its complex relationships and processes. Thomas (2011, p.23) highlights this:

> *"A case study is about seeing something in its completeness, looking at it from many angles".*

The author adds that it is not possible to generalise from a case study. This study being exploratory in nature does not intend to generalise from its findings, and therefore has this in common with case study research.

One of the important points of case study research is that it utilises multiple methods (Robson, 2011, p.136). Carrying out a survey at each of the sites can be viewed as a contribution towards a case study, but it is only one method and not holistic in nature. The researcher believes that further methods such as observational studies or interviews would need to be carried out in order for the research carried out at the libraries to be seen as true case study research. However it could be argued that the three cases are partial case studies, and with this in mind, the results from each site will be analysed separately.

4.3.6 Questionnaire design

The design of the user questionnaire for this study needed careful consideration. Oppenheim (1992, p.7) believes that surveys often have insufficient or even a complete lack of planning and design. He adds:

> *"...the weaknesses in the design are frequently not recognized until the results have to be interpreted – if then!".*

Bryman (2008, p.248) believes that researchers should be willing to consider the use of questions that have already been used by other researchers, and which may already have had their validity and reliability proved. This is a way of overcoming the problems identified above by Oppenheim. Similarly Sarantakos (2005, p.254) urges researchers to carry out a search for questionnaires that have already been used with a view to adopting or adapting them, and Rugg and Petre (2007, p.142) agree that using a questionnaire that has already been used in another study can be valuable. These authors believe that a poor choice of questions is the main problem with questionnaire-based research, but also warn researchers to be certain that the replicated questionnaire is appropriate for its new use.

With these points in mind, the questionnaire for this study has been adapted from Koohang's (2004) research into users' views of digital libraries. This has two main parts to it, along with an introductory section which gathers brief background information about a participant, for example age group, gender, and experience of using the internet. The first part concerns library users' current views on using digital libraries, and participants are asked to rate 12 usability properties via a series of 5-point Likert scale questions. While it has been argued that including a middle scale (as in a 5-point or 7-point scale) will be too attractive to participants and seen as an *"easy way out"*, it has also been pointed out that it is wrong to force participants into a positive or negative answer as *"Respondents may legitimately be neutral",* and this may in fact prove annoying to participants (Aldridge & Levine, p.112).

The second part of Koohang's questionnaire requires participants to rate how important each of the 12 usability properties is to them (perceived importance), via the same scale. This means that it is then possible to calculate the gap between how the user rates the usability of the library and how usable it should be ideally.

Koohang's questionnaire was selected as a model for this study for a number of reasons. Firstly, the Introduction and Literature Review sections of this study have discussed the links between user experience and usability, with usability appertaining to whether a user can achieve their goal and user experience being about the quality of the reality of doing this. Koohang's questionnaire breaks down user experience into questions about 12 usability properties which can be seen as integral to a library user being able to achieve their goals, and which jointly contribute to an overall library user experience.

Secondly, a panel of experts comprising of five university professors from the fields of information technology, information systems, and information science determined the 12 usability properties which could be applied to digital libraries. The properties include simplicity: whether the library is simple and straightforward to use, user control: whether the user feels in control of his or her actions in the library and knows what to do, and navigability: whether the user can find his or her way around the library and its systems. The other nine properties are:

- Comfort – whether the user feels at ease using the library.
- User-friendliness – whether the user believes the library is user-friendly.
- Adequacy – does the user feel the information accessed in the library meets their needs?
- Consistency – are the words, terms and actions used in the library consistent?
- Access time – can the user find what they need in a reasonable time?
- Readability – is the information accessed readable and uncluttered?
- Recognition – whether the use recognises the features and functions of the library.
- Visual presentation – is there signage and text to grab the user's attention?
- Relevancy – is the information accessed in the library relevant to the user's requirements?

Thirdly, when carrying out a questionnaire, it is important that the questions have the same meaning for all respondents. This is because if different respondents interpret questions in different ways, they can make the analysis largely meaningless as they have in effect answered different questions (Greenfield, 2002, p.175). The researcher liked the simplicity of Koohang's questionnaire, and felt that the questions were very straightforward, using non-technical language, and would require little explanation to participants.

Finally, the questionnaire was selected because it has been subjected to a series of statistical procedures to prove its validity and reliability.

Although Koohang's questionnaire has been designed with the aim of surveying users' opinions of digital libraries, the 12 usability properties can equally be applied to traditional libraries, or to today's university library which is a mix of the physical and digital realms. For example a library building as well as a digital library needs to be user-friendly, and visual presentation is as important in a library building as on a library website. For this study, Koohang's questionnaire has been adapted so that participants are asked to consider the physical and digital libraries as a single entity when answering the questions. A thirteenth question has been

added to both the section on current views of library usability, and to the section on the perceived importance of library usability, to ask about the overall importance of a good user experience and usability in the library.

The first part of the adapted questionnaire collects background information about the participant, for example age, area of study, and gender. There is then a series of questions about library use in order to decide whether the participant is a regular or infrequent, experienced or inexperienced library user. Following this, participants are able to indicate what type of activities they undertake when in the library and when using the library website, for example searching the catalogue, using the library PCs, or borrowing books and other materials.

The main two parts of the questionnaire follow the introductory section, and after these the participant is asked for any user experience or usability issues that they have encountered. This part is a freeform box to be filled in by the researcher.

The researcher decided that the best approach to achieving responses to the questionnaire would be to administer it personally by asking library users to take part and then filling in their responses while with them. This is firstly because of the issues discussed earlier in this chapter regarding response rates, participants achieving a better understanding of the questions, and incomplete questionnaires. It is also because university students are often asked to complete either paper-based or web-based questionnaires, and as a result some universities are actively trying to limit the number of them being carried out. As an example of this, at CU the researcher was informed that it would be unlikely that a paper-based or web-based survey could be allowed due to the large number of them that had recently taken place within the university. It has also been suggested that the researcher will have a better feel for the data if they collect the data personally (Walliman, 2006, p.88).

Although the researcher felt that the questions regarding use of the library were simple to understand with straightforward, non-technical language, administering the questionnaires personally meant that the researcher could answer any questions that participants had about the survey. However, the researcher tried to

adhere to the script of the questionnaire as much as possible because as Czaja and Blair (1996, p.63) discuss, it has been shown that changing the wording of questions can produce different results. The authors add:

> *"The reliability of the data obtained through survey research rests, in large part, on the uniform administration of questions and their uniform interpretation by respondents".*

A total of 40 questionnaire responses were to be collected at each of the three university libraries to make the survey statistically valid making a total of 120 responses from the three survey sites. It was originally estimated that it would take between five and eight full days at each location to achieve the required number of questionnaire responses.

The survey required library users as participants, and took place in university libraries. As with the selection of survey sites, the sampling frame for this part of the study is a purposive sample.

The researcher felt that a purposive sample was appropriate as by being in the library, she was among the population needed for the survey, i.e. library users, Also, the exploratory nature of the study meant that the researcher did not aim to generalise from the results. Additionally, Bryman (1988, p.35) notes that the use of random sampling is seen as a way of being able to generalise from survey results, but there may still be issues with this:

> *"….survey research findings may lack generality too, even when a random sample has been extracted".*

In order to create as little disturbance as possible at each library as it is a workplace, the researcher aimed to avoid people who appeared to be concentrating deeply on their tasks and work, and approach those involved in lighter activities such as browsing for books or surfing the internet. Kumar (2014, p.244) notes that participants in a purposive sample are in the judgement of the researcher(s) *"…best positioned to provide you with the information needed for your study".* Participants were to be thanked but not rewarded for taking part.

4.3.7 Carrying out the user survey

Once permission for the survey to be carried out had been received at each of the university libraries, the researcher was able to schedule a plan of work for that institution. At UoWL, the researcher was able to work more flexibly by visiting the library for shorter time-spans because it is the university at which she is studying, and it is therefore more easily accessible. However, at UoS and CU the schedule had to be planned in advance as it needed to be agreed with the respective managers at each of the libraries. Additionally the researcher needed to consider the travelling costs and time involved in reaching these institutions. UoS is approximately 30 miles from the researcher's home and it takes about an hour to reach by car, while CU is 65 miles away and takes about 90 minutes to reach by car.

Prior to carrying out the survey at the selected sites, the researcher undertook a pilot study of the questionnaire. Piloting should be seen as essential and is *"a dummy run of the survey proper"* (Aldridge and Levine, 2001, p.90). Bryman (2008, p.248) recommends finding a small number of participants similar to the population from which the sample will be taken so as not to affect the representativeness of the subsequent "real" sample, while Sarantakos (2005, p.90) believes the quality of the piloting, and trying to do the pilot test correctly the first time it is done is more important than the quantity of the participants taking part. The researcher therefore selected three people who were not known to her, and who were in the student refectory at UoWL one afternoon. The benefits of this pilot study were that it gave the researcher a chance to practise approaching potential participants, and also to practise going through the questionnaire with participants. Only minor changes were made as a result of this pilot study, and this gave the researcher increased confidence in the questionnaire.

A plan for between five and eight questionnaires per day at UoS and CU was made initially, which meant that a total of five to eight visits would be required to each library. At UoWL, three or four questionnaires were planned per half day with a total of 10 to 14 visits.

At CU the first visit was made in December 2011, and on this first occasion the researcher had a discussion with the library manager about the survey, and collected three survey responses. Subsequent visits were made in February 2012 (2 visits, 21 responses), May 2012 (1 visit, 7 responses), and June 2012 (1 visit, 9 responses), making a total of five visits to collect 40 responses. At UoWL, the survey was carried out over eleven library visits between February 2012 and June 2012 in order to collect the required 40 responses, and at UoS a total of 6 visits were made with all 40 survey responses collected in August 2012.

At UoS the fact that all survey responses were collected in the month of August meant that the primary population of participants was highly likely to consist of postgraduate students. This was because undergraduates would have finished their studies for the year, while postgraduates would still be completing their master's degree dissertations, or working on their PhD projects. It had been hoped to collect survey data at UoS prior to August in May and June 2012, but unlike UoWL and CU, UoS had a requirement for the survey to be cleared by the university's ethics committee. In order to gain this clearance, the researcher had to submit a number of documents: a survey participant information sheet, a consent form for participants, a detailed research protocol, a summary of the project, and a covering letter. These were provided in May 2012, and then some changes were required meaning that approval from the ethics committee was not received until July 2012. However, the views of postgraduates are as important to this study as those of undergraduates, and of course all students surveyed at CU are postgraduates because of the nature of that institution.

At each library the researcher approached potential participants and asked if they would be willing to take part. This was done in a standardised way:

> *"Excuse me, I've been given permission to carry out a survey about the library. It's a questionnaire that I would fill in with you, and takes about 10 to15 minutes to complete. Would you be willing to take part?".*

Approximately two-thirds of people approached agreed to take part, with a very small minority stating that they would like to participate at a later time but were busy at that moment. When a person agreed to take part, the researcher took a

seat next to them and introduced herself by showing her identification badge from UoWL:

> *"My name is Alison Wiles and I'm a research student at the University of West London".*

At UoS, participants were given a participant information sheet at this point. This included information about the study including its aims, contact details for the researcher, and the risks involved in taking part (of which there are none). It follows UoS's standard format for participant information sheets.

The researcher then referred to the questionnaire and read aloud the first part of the introduction to the participant:

> *"The aim of this questionnaire is to obtain users' opinions of their university library. This is for a study looking at user experience and library system usability".*

At this point the researcher asked whether the participant was familiar with the term usability. A very large majority were, but the researcher gave a short definition just to be certain:

> *"Usability is to do with how easy a system is to use, how user-friendly it is and so on".*

All participants seemed to be satisfied with this definition. The next part of the introduction was then read aloud:

> *"Names of participants are not required, and all data collected will be treated in confidence and only used for the purpose of this study. It will take five to ten minutes to complete."*

A check was made at this point to be certain that the participant was still willing to take part and they were informed that they could of course withdraw from the process at any point. UoS participants were asked to read and sign a participant consent form which had four statements on it. Firstly participants agreed that they had been given information about the nature of the study, and secondly it stated that all data collected would be treated in confidence and in accordance with the 1988 Data Protection Act. Thirdly it re-iterated that participants were free to

withdraw from the study at any time, and finally it confirmed that the participant had agreed to take part.

Once these formalities had been done, the main body of the questionnaire could be completed. It was emphasised to participants that the physical and digital aspects of the library should be considered as a single entity when answering the questions. The researcher then continued to read the questions to the participants and fill in answers, answering any queries that they had about the questions.

At the end of the questionnaire the participants were thanked for their time. Occasionally they would ask questions related to the study, or would talk more generally about research degrees or their plans for the future when they completed their studies.

When originally planning the survey, it was easy to imagine a process with no issues or problems along the way. However this was not the case, although the problems encountered were minor. For example many library users were wearing earphones or headphones when working, sending a “do not disturb me” message when the researcher was looking for questionnaire participants. There were also people who appeared too involved in their work to be interrupted (although this had been expected), and similarly it did not seem suitable to ask those working in groups or pairs to participate. Sometimes there simply was not enough space for the researcher to sit next to a participant due to the layout of desks, or because it was a busy time in the library and all available workspaces and chairs were taken. The researcher also found that the process of repeating the questionnaire many times could become tiring, and that a lack of participants or a few refusals to take part could be dispiriting. Despite these issues data collection went fairly smoothly, and the researcher found that being patient and not becoming anxious about the quantity of questionnaires completed in particular timescales, was the best way to approach it.

At the end of the data collection period, a total of 120 questionnaire responses had been achieved, with 40 from each of the three survey sites as originally planned.

4.4 Survey of library policies

The third and fourth research questions for this study are:

Which type of policies do UK university libraries have, and do they have user experience or usability policies?

How can a user experience policy bridge the gap between users' experience and expectations of using their university library and its systems?

To answer these questions, an analysis of university library policies was undertaken. The aim of this was to see which types of policies UK university libraries have in place, whether a policy for user experience factors exists at these institutions, and if so what the policy covers.

A survey of UK university library websites was carried out. In order to do this, a list of all UK universities was obtained from the Guardian newspaper's "University guide 2013: University league table" (Guardian, 2012), which is a ranking list of the main universities in the UK. Additionally Cranfield University, as it is a survey site for this study, was added to the list to make a total of 121 universities. As a solely postgraduate institution, it does not appear in university league tables. The website of each of the 121 universities was then investigated to ascertain the policies in place.

The survey was in three parts: firstly a qualitative data analysis approach was adopted to investigate the user experience policies in place at each library, and secondly a quantitative approach was taken to record which policies apply to each library. Thirdly, a number of UK university libraries were contacted with the aim of finding out whether the libraries present all of their policies on their website, and also to ask if they have a user experience policy. Data collection for this survey initially took place in December 2012 and January 2013, and it was estimated that each university library website would take approximately one hour to investigate and record details. The follow-up survey regarding whether libraries present their policies on their website was undertaken in April and May 2015.

A survey which deals with documents has the advantage of not having the difficulties faced by researchers dealing with people, such as rejection, non-response, and bias (Sarantakos, 2005, p.398). Similarly, Robson (2002, p.358) believes that this method of data collection has the advantage of being unobtrusive, but adds that it has the potential problem of the documents that are available being limited in some way.

4.4.1 Qualitative analysis of user experience policies

The aim of the qualitative survey was to record details related to user experience policies, and this was done by looking at the library website for each university and making notes about any such policies that were found. Robson (2002, p.456) notes that this type of qualitative data can supplement and also help to illustrate quantitative data collected via a survey.

As each library website was inspected, details related to user experience and related policies were noted on a Microsoft Word document. These notes could then be analysed for themes. Bernard & Ryan (2010, p.55-56) explain that themes are derived from both the data being analysed, and also our prior understanding of what is being studied, which may come from professional definitions that have already been agreed on, as well as the researcher's own values and experiences.
From the work undertaken for the literature review in terms of reading and synthesising information about user experience and policies, the researcher had gained an understanding of the types of data being searched for on each library website. The websites were examined for keywords and phrases such as:

- user/student experience
- user-centred
- usability
- user interfaces
- user-friendly
- library systems.

Three main themes were identified from this analysis:

- user experience
- user interfaces
- usability.

These were the keywords and phrases which occurred most regularly, and each data note could then be allocated to one of the three themes.

The survey also gave the researcher the opportunity to explore each library's website in detail and, to identify the types of policies that each library implements. Seven main policy types were established which could then be used in the quantitative analysis of policies. These were:

- Library mission -
  the aims and strategies of the library

- Collection development -
  how the library decides which items to stock, in terms of both physical and electronic items.

- Customer charter -
  how the library will treat its customers in terms of standards and customer care.

- Website policy -
  how the library designs and maintains its website. Whether it follows usability and user experience principles such as carrying out usability testing or gathering user feedback.

- Library regulations -
  the rules and regulations of the library that library users are expected to abide by. For example food may be prohibited in the library.

- Computing regulations -
  the rules and regulations for using the library's computers, also covering acceptable use of these computers.

- Access policy -
  the rules for who can use the library and what they can do. For example some universities allow the general public access to browse the collection, while others do not.

4.4.2 Quantitative analysis of policies

The quantitative survey looked at the seven different policies that were identified by the preceding qualitative survey, and recorded which ones applied to each university library. Bryman (2008, p.283) describes this approach as a content analysis, which Bernard and Ryan (2010, p.287, 289-90) define as *" a set of methods for systematically coding and analysing qualitative data"*. These authors state that content analysis is usually quantitative in nature and involves the creation of codes (or themes), and the application of these codes to the selected texts. Similarly, Bryman (2008, p.283) suggests that a coding schedule and coding manual are created for recording the data. The coding schedule is the form onto which the data being recorded is input, and the coding manual lists all the possible categories for each variable being entered. In this survey, the following variables made up the coding schedule:

- University name
- University type
- Library mission
- Collection development policy
- Customer charter
- Website policy
- Library regulations
- Computing regulations
- Access policy

For the coding manual, university name is simply the institution's name such as Aberdeen, Brunel, or York, while university type has eight classification types:

- AN – an Ancient university, effectively founded before the 19th century
- RB - a Red-brick university, the six original civic universities plus others granted a charter from 1900 to 1962
- PG – a Plate-glass university, those granted a charter between 1963 and 1992, but mainly in the 1960s
- NE – a New university, those created from 1992 onwards
- UC – a University College, those institutions offering degrees but not recognised as a university
- UL - University of London, the 22 institutions that form the University of London
- UW – University of Wales, the ten institutions that form the University of Wales
- UI - a Unique Institution, Cranfield University and the University of Buckingham
- OT – another type of institution, one that does not fit any other category

(The Student Room, 2013)

This variable, university type was added to the coding schedule to add a layer of analysis to the results, so for example it can be seen which types of universities are more likely to have particular policies. There are then the seven types of policies to be coded and on the coding form a letter "Y" will be entered if the policy exists or a letter "N" if it does not exist.

Each university library website was looked at in turn, and its policies were investigated. The coding form was a Microsoft Excel spreadsheet, and this was filled in as each website was inspected.

Naturally the library websites varied greatly in terms of layout, content, and how easy is was to find the required content, meaning that some websites were very quick to analyse while others took much longer. Another problem encountered by

the researcher was the repetitive nature of the task which was overcome by taking a break or carrying out other work.

At the conclusion of the data collection period for the survey, all 121 university library websites had been inspected and the necessary data about them had been recorded.

4.4.3 Follow-up survey of university library policies

A follow-up survey was carried out in order to ascertain whether UK university library policies always appear on the library's website, and whether university libraries which do not have any type of user experience/usability policy on their website do in fact have one in place. This was done because it is easy to assume that if a library does not have a policy on its website, then it does not have this policy in place. However this may not be the case if for example a library displays its policies as a list within the library, or on its intranet which is not accessible by the general public.

The aim was to receive responses from at least 20 UK university libraries, a snapshot of the 121 university libraries which had originally been surveyed. This was because the researcher felt that 20 responses would give a good sense of how libraries dealt with their policies as it is approximately one-sixth of the population and thus a sizeable proportion, and also because of time constraints in place when the follow-up survey was to take place.

In order to ensure that each library had the same chance of being chosen to participate, the researcher decided to randomly select the libraries to be contacted using a random number generator process. This type of sampling is simple random sampling, and can be used when the population has similar characteristics or is uniform in nature. Its aim is to guarantee that each type (in this case library) has an equal chance of being selected, and while this may be difficult to achieve in practice, methods such as randomly generated numbers have been devised to make sure that each element does have an equal chance of being selected (Walliman, p.276-7).

Results from the survey of the 121 university library websites surveyed, showed that only three had a policy that covered aspects of user experience and usability. As discussed later in the Results chapter, these were the University of Cambridge, Southampton Solent University and Manchester Metropolitan University. These three libraries were removed from the list of 121 because the aim was to survey those libraries which did not have this type of policy, and the remaining 118 libraries were sorted alphabetically and numbered one to 118. Bryman (2008, p.173) suggests using a website random number generator in order to generate random numbers for a process such as this. He provides a website link to one, but the link is no longer available on the internet. Therefore the researcher searched for an appropriate alternative via the internet using the search engine Google. A suitable website, www.randomizer.org, was found. This service is provided by the Social Psychology Network whose website is maintained by a professor of psychology from Wesleyan University in Connecticut, and it is claimed that it is a popular random number generator having been used more than 4.7 million times since 1997 (Social Psychology Network, 2015; Randomizer, 2015).

The website allows users to specify how many sets of numbers to generate, and how many numbers are required in the set. The researcher decided to create one set of 118 numbers as this would allow for every library on the list to be contacted if necessary (allowing for non-response). The numbers were returned in the following format:

p1=74, p2=42,p3=55, p4=1.....p115=9, p116=15, p117=79, p118=61.

Therefore, the first library to be contacted was number 74 on the alphabetical list, the second was number 42 on the list, and so forth.

An initial list of the first 40 libraries to be contacted was then compiled, taking the view that achieving a minimum of 20 responses could require at least 40 libraries to be contacted. A further list of libraries would be compiled if necessary once these 40 had been contacted and given a reasonable time to respond.

The researcher decided that contacting the libraries by email was the best approach as it has the advantages of being inexpensive and quick to carry out. Other methods considered were letters with pre-paid envelopes, or the use of

web-based survey software such as Survey Monkey. All of these methods including email have the same potential problem of non-response, but a short email has the advantage of the respondent being able to type and send a response in a short time, rather than having to put a letter in an envelope and post it, or follow a link to a website to fill in a questionnaire.

As there was a time lapse between the original policy survey and this contact with the libraries, the researcher revisited each library's website to see if a user experience policy or a policy with similar themes had been developed prior to contacting the library. The researcher also searched for an email address for contacting the library.

The email sent was brief with some background detail and explanation of the study being carried out. It contained two questions:

1. Do all the library's policies appear on the library website?

2. Does [name of university] library have a user experience policy, and if so what does it cover?

The questions were open in nature meaning that respondents could write as little or as much as they liked. Kumar (2014, p.184) stresses the importance of visualising how the information collected will be used when planning whether to use open-end questions as the framing of the questions determines the way that the responses are classified. The researcher decided that a simple "Yes" or "No" response to question one was satisfactory, but thought it likely that some respondents would give fuller answers. Likewise with question two, an answer of "No" would suffice, but if the answer was "Yes", then the respondent would be likely to elaborate on this. This would allow for quantitative analysis of the results in terms of "Yes" and "No" answers, for example the percentage who answered "Yes".

The email was sent to the enquiries desk email address at each library taking the view that from the researcher's previous experience of contacting libraries, the email would be forwarded if necessary to the relevant person. Where no email address existed for a library, the researcher decided to omit that library for the time-being. If all 118 libraries were contacted and fewer than 20 responses

received, the researcher decided that the libraries without email addresses would then be contacted by telephone for a response.

The first three libraries on the list were used as a pilot study to be certain that the email was understood and replied to satisfactorily. These were Northumbria University, Glasgow Caledonian University and Kingston University.

Of these libraries, only Kingston University replied, but the response was clear and satisfactory. In total, 37 of the 40 libraries on the original list were contacted, and 22 responses received. All the libraries which participated were thanked for doing so via email.

4.5 Follow-up survey of university libraries outside the south of England

The three survey sites selected for the user survey were all in the south of England. However, there are of course university libraries throughout the rest of England, along with Scotland, Wales, and Northern Ireland, and also throughout the remainder of the world. In order to gauge how representative the results of the user survey at the three survey sites had been, the researcher decided to send a results summary to a selection of university libraries outside the south of England, and to ask librarians for their comments.

Kumar (2014, p.228-9) notes that in qualitative research the purpose of sampling is to gain in-depth knowledge, and that this is done by selecting *"information-rich"* respondents who can provide a researcher with the information required. With this in mind, the researcher decided to approach some of the university libraries which had proved to be helpful when carrying out the follow-up survey of university library policies. In Scotland, the libraries of the University of Edinburgh and the University of the West of Scotland had both given full responses to the questions regarding library policies, and both had offered to give further help. They were therefore the first two libraries which were contacted for this follow-up survey.

The researcher also came across some university libraries in the USA which were actively working in the field of library user experience. As a result of entering the

term "*library usability*" into the Google internet search engine, a website was found which contained hyperlinks to the University of Michigan and University of Virginia library websites. The University of Michigan library has a user experience department as its website explains:

> *"Our efforts are focused on the interface design, user research, assessment (usability, web use statistics analysis), content management and strategy, and web accessibility"*

(University of Michigan, 2015).

Similarly, the University of Virginia library runs user experience projects, and the library staff offer advice on carrying out user experience and usability research (University of Virginia, 2015).

These two libraries were also contacted as part of the follow-up survey of libraries outside the south of England, as the researcher felt that they would have the knowledge to fully understand the aims and results of the research that had been carried out. They would also be more likely to have an interest in the research and therefore would be able to respond more fully. Additionally it would be interesting to have an international view on the results achieved.

The question posed to the four university libraries was:

> **How do you think the results would differ and how would they be similar if the survey was carried out at the [name of university] library?**

Once again this was an open-ended question allowing for a greater depth of and more interesting data. The question was emailed directly to the people who had previously responded at the two Scottish university libraries, and to the enquiry desk email addresses of the two US university libraries. A results summary was attached to each email explaining the purpose of the user survey which had been carried out at the three English university libraries and giving a two page summary of the survey results. For example, it showed the statements regarding usability properties that the participants had agreed strongly with, and the ones they had agreed with less strongly. The summary also showed the areas where the largest gaps between current views and perceived importance had occurred.

The researcher decided to email the question to the four libraries because the distances were too great to allow travel. Telephone interviewing was considered but was not undertaken due to time constraints in place both for data collection and data analysis.

Of the four libraries contacted, three responses were received. However, one of the responses was to say that the library would not be able to participate at the present time due to staffing issues. This meant that two libraries commented on the results: the University of Edinburgh library and the University of Virginia library. Both respondents were thanked for their replies via email.

4.6 Data analysis

Data for this study was collected primarily from two sources: a questionnaire survey of library users and a survey of library policies. There was quantitative data to analyse from both, and additionally some qualitative data in the form of questionnaire comments and library policy information.

Library questionnaire data needed to be statistically analysed and the software package SPSS was used for this purpose. This allows the calculation of mean scores, and also calculation of the gap between users' current views and perceived importance of library usability properties. Cross-tabulations show scores by factors such as age, area of study and gender.

As the data collected is ordinal in nature, non-parametric tests were required to analyse questionnaire responses. The Mann Whitney U-test also known as the Wilcoxon rank sum test was used in order to compare the rankings of the usability properties between the different survey sites. It is the non-parametric version of the two-sample t-test (Taylor, 2007, p.141).

Additionally, the Wilcoxon matched pairs test (or signed rank test) was used to compare the mean values of the current views with the mean values of the perceived importance views at each survey site to see if they differ statistically. This non-parametric equivalent of the paired t-test can be used when working with

ranked data and comparing dependent samples. It is often used in studies to identify whether there has been a change in behaviour, such as the effects of an advertising campaign (Argyrous, 2005, p.353: Taylor, 2007, p.142).

The data from the quantitative study of library policies was entered onto a Microsoft Excel spreadsheet, and as this data is smaller in volume than and not as complex as the questionnaire data, this software package was also used to analyse it.

There was also qualitative data as library questionnaire comments had to be analysed for themes, and similarly the qualitative policy data needed to be analysed. As the volume of this data was not large, the researcher decided to manually analyse it rather than use a software package such as NVivo. Dawson (2009, p.116,p.122,p.124) discusses how the use of this type of software can save the researcher a great deal of time, but has the drawback of stopping researchers becoming really familiar with the data. The author adds that qualitative data analysis is suitable for open-ended questionnaire comments, and believes it is *"a very personal process, with few rigid rules and procedures".*

As discussed in section 4.4.1, content analysis of the qualitative policy data identified three themes:

- User experience
- User interfaces
- Usability.

Similarly, in order to analyse the questionnaire comments, a content analysis approach was taken. The researcher went through the comments on each questionnaire, creating themes for the comments and allocating each comment to a particular theme. Six themes were identified in total:

- E-resources
- Information needs
- Library stock

- Praise for the library
- Technology
- Library environment.

Occurrences of these themes could then be counted and collated.

Data was also collected for the two smaller follow-up surveys. This data was collected via email, and collated using Microsoft Word. Responses were cut and pasted onto a document and then analysed. In the case of the follow-up survey of library policies, this involved counting “Yes” and “No” responses, while analysis of the follow-up survey of libraries outside England required analysis of the content of the responses.

4.7 Ethical considerations

This study involves human participants and therefore research ethics needed to be considered. As described previously in this chapter, each person taking part in the research was informed of the purpose of the research and was allowed to withdraw at any point if they wished to do so. No names of people are mentioned in this thesis, and data from each institution involved has been treated as confidentially as possible.

The researcher has taken the ethics code of the School of Computing and Technology at the UoWL into account. As this study is business-related in nature, ethical clearance was not required at UoWL. Likewise, CU did not ask for an ethical review of the study to take place. However, as discussed previously (in section 4.3.7), UoS did request that the study should be reviewed by this university’s ethics committee, and for this process the researcher had to provide a number of documents such as a summary of the project and a detailed project protocol. Participant information sheets and consent forms were also required for participants at UoS.

4.8 Timescales for data collection

The data collection for the first stages of this study was started in December 2011 and was completed in January 2013. The follow-up surveys of university library website policies and university libraries outside the south of England were carried out between April and July 2015.

5. Results

This chapter discusses the research results.

5.1 The library survey sites

Chapter 4 discussed how the three survey sites were eventually confirmed as the University of West London, Cranfield University and the University of Surrey, and how a number of UK university libraries were visited as a preliminary part of this study. These visits were carried out between November 2009 and August 2010, and had the aim of finding suitable sites for the user survey, and also to enable the researcher to gain more knowledge and experience of university libraries. Descriptions based on observation of activities at these eight libraries now follow, along with descriptions of the libraries at the three survey sites from the time they were visited.

5.1.1 Brunel University

Brunel University was founded in 1966 and now has nearly 15,000 students studying at its campus in Uxbridge, west London. Its traditional strengths have been in the fields of engineering, science and technology (Brunel University, 2010a).

The university library stocks over 458,000 books and 17,000 journal titles, and has 1,200 study spaces and 280 PCs (Brunel University, 2010b). It is in a central location on the campus, and entry to the building is via a turnstile activated by a library membership card. The library has four floors with the top floor allowing silent study only. There are a number of study rooms available throughout the building for group or quiet study, and online public access (OPAC) personal computers (PCs) on each floor. The library accommodates many desks and study tables, and the bookshelves are arranged fairly closely together. It was busy and fairly noisy on the day of the visit, with long queues at the issue desk despite the availability of a number of self-issue machines nearby.

5.1.2 Royal Holloway University of London

The university is located in Egham, Surrey on a 135 acre campus, and was opened in 1886. It has 8,500 students of which 1,700 are postgraduates, and is the leading UK institution for music research (Royal Holloway, 2010a).

The Bedford Library opened in 1993 and has 600,000 volumes in its collection. It was refurbished in 2008 (Royal Holloway, 2010b). The library is set in a bright and leafy part of the campus, and has three levels with the top floor allocated to silent study. Other areas are set aside for quiet study or computer work, and there are also soft furnishings for more relaxed studying or group activities. There is a coffee shop near to the entrance, which made this area fairly lively during the visit. Access to the building is not controlled via a turnstile or other method, and lighting between the shelves is triggered by movement nearby. The ground floor was very busy on the day of the visit, although there were no queues at the issue desk.

5.1.3 Bucks New University

Bucks New University has campuses in Uxbridge, west London and High Wycombe in Buckinghamshire, and has approximately 9,000 students with two-thirds of these being mature students. There are two faculties at the university, Design, Media & Management, and Society & Health (Bucks New University, 2010a, 2010b).

The High Wycombe campus library is situated within the main building on the site, and access is controlled via a turnstile. The building is modern and brightly lit and the predominant colour for furnishings is red, complemented by white walls and large picture windows with striking views over High Wycombe. The library has four floors with the top two floors being smaller in area and also quieter. The bookshelves in this library are noticeably lower than many of the other libraries visited, and journals are stored in electronically controlled rolling shelves. There are rooms allocated for using PCs, and also smaller meeting rooms some of which have glass panels for walls. The library was busy on the day of the visit and also noisy with a long queue at the issue desk.

5.1.4 University of Reading

The university is located in the Berkshire town of Reading, and received its royal charter in 1926. It now has 17,500 students, and a wide portfolio of courses covering the arts, humanities, sciences and social science (University of Reading, 2010a).

The university libraries hold over 1.2 million items, and the main library is based on the Whiteknights campus (University of Reading, 2010b). It is a large building on six levels with no access control in place, although visitors are asked to register at reception. There is a coffee shop near to the entrance and this was busy and noisy on the day of the visit, while the first floor mainly accommodates PCs and group study rooms. The library has a traditional feel to it and there is an emphasis on quietness throughout the building. Each floor has a staffed information desk. The building seemed dark on the day of the visit although it was a fairly bright autumn day, but this may have been because of the sheer volume of books and the high shelves in place to store them. Lighting between the shelves was triggered by movement.

5.1.5 Kingston University

Kingston University has four campuses in Kingston-upon-Thames, south-west London, and approximately 23,000 students. A former polytechnic, the university dates back to 1899 when Kingston Technical Institute first opened (Kingston University, 2010a).

There is a library on each of the four campuses, allowing access to 420,000 books and audiovisual items. The Penrhyn Road library provides services for the faculties of arts, social sciences, science and computing (Kingston University, 2010b, 2010c) and was the focus of this research. The library is situated within the main campus building, and access is not controlled. The ground floor has an issue desk area and a food vending machine zone where a large television was showing a news programme. There is a number of touch-screen self-issue machines and also a small outdoor reading garden. The ground floor also has a designated area for advice about careers and study skills. Each floor has an enquiries desk and

there are a number of group study areas and rooms throughout the library. Enclosed single person study desks are available although not all of these have power sockets meaning that laptop computers cannot always be used. During the visit, the library was busy and fairly noisy. It was also very warm despite it being November.

5.1.6 St Mary's University College

St Mary's is a smaller university with just under 4,000 students. The campus is in Twickenham, south-west London, and the university prides itself on its graduate employment rate, and its record in sport in higher education (St Mary's University, 2010).

The library is situated off a large courtyard within the campus, and is set over two storeys with the issue desk close to the ground floor entrance. Access to the building is not controlled. Some staff wore T-shirts with the message "Can I help?", and the issue desk was not particularly busy on the day of the visit. There are two self-service issue machines, but no food and drink vending machines or cafe area. The ground floor has a silent study area with single self-enclosed desks, and there are also a number of group study rooms. On the day of the visit it became clear that there had recently been noise problems at the library as there were notices on desks warning of loss of computer privileges for noisy students. The first floor houses the IT helpdesk, an area containing PCs, and more books.

5.1.7 Middlesex University

The main campus of Middlesex University is in Hendon, north London with more than 34,000 students studying here and at its partner institutions. It offers a broad range of courses across its four faculties (Middlesex University, 2010a).

Its library, the Sheppard Library, is a glass and steel building, and has over half a million items in its collection (Middlesex University, 2010b). It has a large reception area with access controlled via a turnstile, where security staff issue temporary library cards to visitors. A large plasma screen displays the location of PCs and

states whether they are in-use or still available to use. The building has very large windows with far-reaching views of the surrounding area, and there are window blinds to keep out the sun. There are four floors and a basement level, and a cafe located just outside the library. Postgraduates have a designated PC room which has a card entry system, and there are other rooms set aside for quiet and silent study. There are also spaces for students to use their own laptops, and a number of enclosed single person study desks. The library was quiet on the day of the visit as it was vacation time, but there was some building work going on.

5.1.8 University of Surrey

The university's library is situated centrally in the university's Stag Hill campus. Access to the library is via a turnstile, and the ground floor reception area has an issue desk, membership desk and information desk along with two self-issue machines, a photocopier and OPAC PCs. The latest editions of journals and newspapers are on the first floor, and this storey also accommodates an area with cafe-style seating and food vending machines. The library is generally decorated in neutral colours, but as a contrast to this the third floor has brighter shades of green and orange in an area known as "Splash". There are soft furnishings and coffee tables here to encourage group working and collaboration. Book shelves are fairly close together in this library and lighting is triggered by movement. The second floor is for silent study, and there are a number of seminar rooms which can be booked for group study. On the day of the visit there were building works in progress which caused some noise and disruption. However, it was vacation time and there were very few students in the library.

By 2012, the library at UoS had been significantly extended. The issue and information desks, along with seven self-issue machines are now in a new wing on the first floor of the building. The extension has added a large amount of study space to the first and second floors, and just outside the library turnstile entry area there is a colourful meeting area full of soft furnishings and workspaces. There are also a number of PCs in this area, and a refreshments area containing a water cooler with paper cups.

5.1.9 University of West London

The library of UoWL at Ealing is housed in a building attached to other parts of the university on the Ealing campus. It has four floors, with the ground floor containing a careers advice centre for students, along with a series of library self-issue machines, and a helpdesk which is staffed at peak hours. The first floor is set aside for silent study and also has a number of PCs for student use as well as shelves of books. The library and IT helpdesks are on the second floor along with the bulk of the PCs and printers available in the building. Staff offices are also based here, with the rest of the space given over to books. The third and fourth floors also contain book shelves, PCs, and study areas, but the fourth has provision for group work with some seminar rooms as well as large round tables with screens around to help keep noise to reasonable levels.

5.1.10 Cranfield University

The library of CU was built in the early 1990s by the well-known firm of architects Foster and Sons. These architects also designed Chek Lap Kok Airport in Hong Kong, the new Wembley Stadium, and Stansted Airport (Foster & Partners, 2013). The library is an airy, stand-alone steel and glass building on campus, and has three storeys. The ground floor has a number of seminar rooms and an area containing food and drink vending machines with a large communal table for work or eating. The first and second floors are similar to each other in layout, and both have individual workspaces with PCs, seminar rooms, and bookstock. Staff are based mainly on the first floor, with helpdesks and self-issue machines here too. Quiet study areas are on the second floor.

5.2 The library user survey

5.2.1 The participants

A total of 120 questionnaires were carried out with library users, 40 at each of the three libraries selected as survey sites. The first part of the questionnaire gathered background information about the participants.

Of the 120 participants, 50 percent were aged 18 to 24 years, 37 per cent were aged 25 to 34 years and 13 percent were aged 35 years and over. Forty per cent of participants were female, and 60 per cent were male.

The following list shows the percentages of types of users who participated:

- Postgraduate 59.2% (71 participants)
- Undergraduate 30.8% (37 participants)
- Research student 6.7% (8 participants)
- Other (alumni etc) 2.5% (3 participants)
- Staff member 0.8% (1 participant)

(n=120, 100% of participants)

These statistics suggest that the participants tended to be younger, male, postgraduates. In fact the five largest groups of participants are as follows:

- Male postgraduates aged 25-34 17.5% (21 participants)
- Male postgraduates aged 18-24 14.2% (17 participants)
- Female postgraduates aged 18-24 12.5% (15 participants)
- Male undergraduates aged 18-24 10.8% (13 participants)
- Female undergraduates aged 18-24 10.8% (13 participants)

(n=79, 65.8% of participants)

In terms of study areas of participants, the most popular five fields were:

- Engineering 24.2% (29 participants)
- Business 18.3% (22 participants)
- Science 11.7% (14 participants)
- Accounting & Finance 8.3% (10 participants)
- Computing 7.5% (9 participants)

(n=84, 70% of participants)

Most participants were studying full-time (94.2%), with 3.3% studying on a part-time basis, and another 2.5% for whom this was not applicable (alumni, staff members etc).

The majority of participants were students studying in their first, or as in the case of postgraduate Master's students, only year of study:

- Year 1 75.8% (91 participants)
- Year 2 9.2% (11 participants)
- Year 3 11.7% (14 participants)
- Not applicable 3.3% (4 participants)

(n=120, 100% of participants)

5.2.2 The participants at each of the universities

The following series of tables show the frequencies and percentages of the participants at each university by age, gender, type (undergraduate, postgraduate, or other such as alumni), study area (business, computing etc), full or part time study, and year of study.

i) Age

UoWL

Age	Frequency (n=40)	Percentage
18-24 years	24	60
25-34 years	9	22.5
35 years and over	7	17.5

Fig. 4. Table showing ages of participants at UoWL.

CU

Age	Frequency (n=40)	Percentage
18-24 years	12	30
25-34 years	23	57.5
35 years and over	5	12.5

Fig. 5. Table showing ages of participants at CU.

UoS

Age	Frequency (n=40)	Percentage
18-24 years	24	60
25-34 years	12	30
35 years and over	4	10

Fig. 6. Table showing ages of participants at UoS.

ii) Gender

UoWL

Gender	Frequency (n=40)	Percentage
Male	23	57.5
Female	17	42.5

Fig. 7. Table showing genders of participants at UoWL.

CU

Gender	Frequency (n=40)	Percentage
Male	28	70
Female	12	30

Fig. 8. Table showing genders of participants at CU.

UoS

Gender	Frequency (n=40)	Percentage
Male	21	52.5
Female	19	47.5

Fig. 9. Table showing genders of participants at UoS.

iii) User type

UoWL

User type	Frequency (n=40)	Percentage
Postgraduate	4	10
Undergraduate	32	80
Staff member	0	0
Research student	3	7.5
Other	1	2.5

Fig. 10. Table showing types of participants at UoWL.

CU

User type	Frequency (n=40)	Percentage
Postgraduate	35	87.5
Undergraduate	0	0
Staff member	0	0
Research student	4	10
Other	1	2.5

Fig. 11. Table showing types of participants at CU.

UoS

User type	Frequency (n=40)	Percentage
Postgraduate	32	80
Undergraduate	5	12.5
Staff member	1	2.5
Research student	1	2.5
Other	1	2.5

Fig. 12. Table showing types of participants at UoS.

iv) Study area

UoWL

Study area	Frequency (n=40)	Percentage
Accounting/Finance	4	10
Airport Management	3	7.5
Art & Design	2	5
Business	13	32.5
Computing	8	20
Hospitality	3	7.5
Law	5	12.5
Music	2	5

Fig. 13. Table showing study areas of participants at UoWL.

CU

Study area	Frequency (n=40)	Percentage
Art & Design	1	2.5
Business	4	10
Computing	1	2.5
Economics	1	2.5
Engineering	19	47.5
Health	6	15
Science	8	20

Fig. 14. Table showing study areas of participants at CU.

UoS

Study area	Frequency (n=40)	Percentage
Accounting/Finance	6	15
Business	5	12.5
Engineering	10	25
Hospitality	8	20
Law	1	2.5
Psychology	1	2.5
Science	6	15
Sociology	1	2.5
Tourism	2	5

Fig. 15. Table showing study areas of participants at UoS.

v) Full or part time study

UoWL

Full/Part time	Frequency (n=40)	Percentage
Full time	37	92.5
Part time	2	5
Not Applicable	1	2.5

Fig. 16. Table showing study modes of participants at UoWL.

CU

Full/Part time	Frequency (n=40)	Percentage
Full time	37	92.5
Part time	2	5
Not Applicable	1	2.5

Fig. 17. Table showing study modes of participants at CU.

UoS

Full/Part time	Frequency (n=40)	Percentage
Full time	39	97.5
Part time	0	0
Not Applicable	1	2.5

Fig. 18. Table showing study modes of participants at UoS.

vi) Year of study

UoWL

Year of study	Frequency (n=40)	Percentage
1	20	50
2	9	22.5
3	10	25
Not Applicable	1	2.5

Fig. 19. Table showing year of study of participants at UoWL.

CU

Year of study	Frequency (n=40)	Percentage
1	36	90
2	0	0
3	3	7.5
Not Applicable	1	2.5

Fig. 20. Table showing year of study of participants at CU.

UoS

Year of study	Frequency (n=40)	Percentage
1	35	87.5
2	2	5
3	1	2.5
Not Applicable	2	5

Fig. 21. Table showing year of study of participants at UoS.

5.2.3 Library use by the participants

The second part of the questionnaire collects information about library use – how often the participant uses the library building and library website, and what type of activities the participants use the building and website for.

Across the three universities, firstly looking at library building use for participants:

- 83.3% use the library building often (once or twice a week or more)
- 12.5% use the library building occasionally (once or twice a month)
- 4.2% use the library building rarely or never

At UoS, there were no participants who use the library rarely or never.

Across the three universities for library website use:

- 60.8% use the library website often (once or twice a week or more)
- 33.3% use the library website occasionally (once or twice a month)
- 5.8% use the library website rarely or never

The percentages for the three universities vary significantly for this with UoWL participants using the library website far less frequently than at the other two institutions:

	UoWL	CU	UoS
Often	40%	70%	72.5%
Occasionally	52.5%	25%	22.5%
Rarely or never	7.5%	5%	5%

Fig. 22. Table showing frequency of library website use at the three universities.

These statistics could be due to the fact that UoWL participants tended to be undergraduates whereas participants at CU and UoS were mainly postgraduates. Postgraduates would be likely to use the library website on a more frequent basis as their higher level of their study would require them to find and read more journal articles than undergraduates.

Across the three universities, when using the library website:

- 45% access it more or less equally from home and the library building
- 30.8% mainly access it from home
- 20% mainly access it when in the library building
- For 4.2% this is not applicable as they do not use the library website

Regarding activities that the participants at the three libraries use the library building for:

- 85.8% borrow and return books or other materials
- 83.3% carry out individual study with their own materials
- 83.3% access computers
- 82.5% carry out individual study with their own books and materials
- 70% do group work
- 59.2% consult books or other materials
- 52.5% make enquiries with library staff
- 33.3% locate books or materials from other universities and institutions (inter-library loans)

Participants at UoWL use the library building for borrowing and returning books or other materials more than at the other two institutions (90%), while participants at CU access computers the least (75%), and do the least group work (57.5%). Participants at UoS use the library more than the other two universities for group work (82.5%) and using computers (95%).

Other uses mentioned by small numbers of users were:

- Reading newspapers and magazines
- Printing
- Socialising
- Using seminar rooms

Looking at library website use by participants across the three universities:

- 89.2% search the catalogue for books and materials
- 85.2% search the library databases and electronic journals for articles
- 63.3% look at electronic books
- 62.5% simultaneously look at information from a number of different sources
- 39.2% use it to find other library-related information e.g. opening hours

At UoWL 72.5% of participants use the library website to search the library databases and electronic journals for articles compared with 87.5% at each of CU and UoS. This once again could be due to the higher numbers of postgraduates participating at CU and UoS, with the increased need for these types of searches at postgraduate level.

Other uses of the library website at the three universities include renewing books, looking at old examination papers, and looking at theses.

Some participants said that they did not use the library website because they used other sources, did not need to use it, and because it is not user-friendly.

5.2.4 Current views on using the university library

The third section of the questionnaire asked for participants' current views of using the university library and its systems such as the website, catalogue, self-service issue machines, library databases and e-journals. This was done via a series of 13 Likert scale questions where the scale was as follows:

- 5 = strongly agree
- 4 = agree
- 3 = neither agree or disagree
- 2 = disagree
- 1 = strongly disagree

i) Q1. The university library is simple to use (Simplicity)

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q1	120	2	5	4.25	0.677

Fig. 23. Table showing results for Q1 across the 3 universities

Then looking at each of the universities individually:

Q1	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	2	5	4.13	0.648
CU	40	3	5	4.35	0.622
UoS	40	2	5	4.28	0.751

Fig. 24. Table showing results for Q1 at each university

ii) Q2. I feel at ease using the library (Comfort)

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q2	120	1	5	4.35	0.694

Fig. 25. Table showing results for Q2 across the 3 universities

Then looking at each of the universities individually:

Q2	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	1	5	4.23	0.832
CU	40	3	5	4.43	0.636
UoS	40	3	5	4.40	0.591

Fig. 26. Table showing results for Q2 at each university

iii) Q3. The library is user-friendly (User-friendliness)

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q3	120	1	5	4.35	0.739

Fig. 27. Table showing results for Q3 across the 3 universities

Then looking at each of the universities individually:

Q3	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	1	5	4.18	0.813
CU	40	3	5	4.45	0.714
UoS	40	3	5	4.40	0.672

Fig. 28. Table showing results for Q3 at each university

iv) Q4. I feel in control of what I'm doing when using the library (Control)

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q4	120	2	5	4.14	0.781

Fig. 29. Table showing results for Q4 across the 3 universities

Then looking at each of the universities individually:

Q4	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	2	5	4.15	0.834
CU	40	2	5	4.03	0.800
UoS	40	3	5	4.25	0.707

Fig. 30. Table showing results for Q4 at each university

v) Q5. The information I access in the library is readable and uncluttered (Readability)

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q5	120	2	5	4.00	0.733

Fig. 31. Table showing results for Q5 across the 3 universities

Then looking at each of the universities individually:

Q5	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	2	5	3.83	0.813
CU	40	3	5	4.23	0.620
UoS	40	3	5	4.25	0.707

Fig. 32. Table showing results for Q5 at each university

vi) Q6. The information accessed in the library is adequate (Adequacy/Task Match)

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q6	120	2	5	3.86	0.873

Fig. 33 Table showing results for Q6 across the 3 universities

Then looking at each of the universities individually:

Q6	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	2	5	3.85	0.864
CU	40	3	5	3.90	0.871
UoS	40	2	5	3.83	0.707

Fig. 34. Table showing results for Q6 at each university

vii) Q7. I can find my way around the library with ease (Navigability)

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q7	120	1	5	4.13	0.856

Fig. 35. Table showing results for Q7 across the 3 universities

Then looking at each of the universities individually:

Q7	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	1	5	4.00	0.906
CU	40	2	5	4.25	0.870
UoS	40	2	5	3.83	0.707

Fig. 36. Table showing results for Q7 at each university

viii) Q8. I quickly understand the features and functions of the library (Recognition)

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q8	120	1	5	3.83	0.857

Fig. 37. Table showing results for Q8 across the 3 universities

Then looking at each of the universities individually:

Q8	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	1	5	3.68	0.944
CU	40	2	5	4.05	0.749
UoS	40	2	5	3.75	0.840

Fig. 38. Table showing results for Q8 at each university

ix) Q9. I can find the information I need in a reasonable time (Access time)

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q9	120	2	5	3.76	0.889

Fig. 39. Table showing results for Q9 across the 3 universities

Then looking at each of the universities individually:

Q9	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	1	5	3.63	0.868
CU	40	2	5	3.95	0.876
UoS	40	2	5	3.70	0.911

Fig. 40. Table showing results for Q9 at each university

x) Q10. The information I get from the library is relevant (Relevancy)

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q10	120	2	5	4.28	0.686

Fig. 41. Table showing results for Q10 across the 3 universities

Then looking at each of the universities individually:

Q10	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	3	5	4.15	0.700
CU	40	2	5	4.35	0.736
UoS	40	3	5	4.33	0.616

Fig. 42. Table showing results for Q10 at each university

xi) Q11. The consistency of terms, words and actions throughout the library is evident (Consistency)

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q11	120	2	5	3.90	0.824

Fig. 43. Table showing results for Q11 across the 3 universities

Then looking at each of the universities individually:

Q11	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	2	5	3.63	0.740
CU	40	2	5	4.18	0.712
UoS	40	2	5	3.90	0.928

Fig. 44. Table showing results for Q11 at each university

xii) Q12. Signage and text to grab my attention are present in the library (Visual presentation)

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q12	120	1	5	3.86	0.955

Fig. 45. Table showing results for Q12 across the 3 universities

Then looking at each of the universities individually:

Q12	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	2	5	3.78	0.891
CU	40	2	5	3.85	1.001
UoS	40	1	5	3.95	0.986

Fig. 46. Table showing results for Q12 at each university

xiii) Q13. The overall user experience/usability in the library is good

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q13	120	3	5	4.35	0.589

Fig. 47. Table showing results for Q13 across the 3 universities

Then looking at each of the universities individually:

Q13	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	3	5	4.20	0.648
CU	40	3	5	4.50	0.555
UoS	40	3	5	4.35	0.533

Fig. 48. Table showing results for Q13 at each university

xiv) Ranking the usability properties

Using these results it is possible to show how the participants rank the 12 usability properties in terms of current views. For all participants (n=120) the properties were ranked as follows:

Ranking	Usability Property	Mean	Standard Deviation
1.	Comfort	4.35	0.694
1=	User-friendliness	4.35	0.739
3.	Relevancy	4.28	0.686
4.	Simplicity	4.25	0.677
5.	Control	4.14	0.781
6.	Navigability	4.13	0.856
7.	Readability	4.00	0.733
8.	Consistency	3.90	0.824
9.	Adequacy/task match	3.86	0.873
9=	Visual Presentation	3.86	0.955
11.	Recognition	3.83	0.857
12.	Access Time	3.76	0.889

Fig. 49. Table showing usability property rankings for current views from all participants

Looking at the rankings by university, firstly at UoWL (n=40), the properties were ranked for current views as follows:

Ranking	Usability Property	Mean	Standard Deviation
1.	Comfort	4.23	0.832
2.	User-friendliness	4.18	0.813
3.	Control	4.15	0.834
3=	Relevancy	4.15	0.700
5.	Simplicity	4.13	0.648
6.	Navigability	4.00	0.906
7.	Adequacy/task match	3.85	0.864
8.	Readability	3.83	0.813
9.	Visual presentation	3.78	0.891
10.	Recognition	3.68	0.944
11.	Access time	3.63	0.868
11=	Consistency	3.63	0.740

Fig. 50. Table showing usability property rankings for current views at UoWL

Secondly the rankings at CU (n=40):

Ranking	Usability Property	Mean	Standard Deviation
1.	User-friendliness	4.45	0.714
2.	Comfort	4.43	0.636
3.	Simplicity	4.35	0.622
3=	Relevancy	4.35	0.736
5.	Navigability	4.25	0.870
6.	Readability	4.23	0.620
7.	Consistency	4.18	0.712
8.	Recognition	4.05	0.749
9.	Control	4.03	0.800
10.	Access Time	3.95	0.876
11.	Adequacy/task match	3.90	0.871
12.	Visual presentation	3.85	1.001

Fig. 51. Table showing usability property rankings for current views at CU

And finally at UoS (n=40):

Ranking	Usability Property	Mean	Standard Deviation
1.	Comfort	4.40	0.591
1=	User-friendliness	4.40	0.672
3.	Relevancy	4.33	0.616
4.	Simplicity	4.28	0.751
5.	Control	4.25	0.707
5=	Readability	4.25	0.707
7.	Visual presentation	3.95	0.986
8.	Consistency	3.90	0.928
9.	Adequacy/task match	3.83	0.707
9=	Navigability	3.83	0.707
11.	Recognition	3.75	0.840
12.	Access time	3.70	0.911

Fig. 52. Table showing usability property rankings for current views at UoS

These results show that despite the differing types, ages, genders, study stages and study areas of the participants, and the fact that the libraries themselves differ in many ways, the participants' experiences of using the libraries are somewhat comparable. The properties comfort, user-friendliness, relevancy and simplicity feature towards the top of each list of rankings showing the areas of library usability that participants feel most content with. Similarly, adequacy, recognition and access time appear near the bottom of each list and are areas where the participants are less pleased with the usability of their library.

It is then possible to compare the mean for each usability property at each university library with the same property at the other libraries. For example, comparing the mean value for current views of user-friendliness at CU with the mean value for current views of user-friendliness at UoWL. This is done by using

the Mann-Whitney U test. The null hypothesis for this test is that there is no difference between the means at each of the libraries.

Firstly for UoWL and CU:

Usability Property	**Significance value**	**Significant difference between means? (p<0.05)**
Adequacy	0.838	No
Signage	0.629	No
Control	0.418	No
Comfort	0.309	No
Relevancy	0.152	No
Navigability	0.139	No
Simplicity	0.118	No
User-friendliness	0.091	No
Recognition	0.070	No
Access time	0.061	No
Readability	0.023	Yes (p<0.05)
Consistency	0.001	Yes (p<0.05)

Fig. 53. Table showing mean comparisons for current views at UoWL and CU

Secondly for UoWL and UoS:

Usability Property	Significance value	Significant difference between means? (p<0.05)
Adequacy	0.886	No
Recognition	0.868	No
Control	0.715	No
Access time	0.699	No
Navigability	0.611	No
Readability	0.556	No
Comfort	0.441	No
Signage	0.351	No
Simplicity	0.229	No
Relevancy	0.270	No
User-friendliness	0.203	No
Consistency	0.062	No

Fig. 54. Table showing mean comparisons for current views at UoWL and UoS

And finally for UoS and CU:

Usability Property	Significance value	Significant difference between means? (p<0.05)
Simplicity	0.794	No
Comfort	0.771	No
Adequacy	0.734	No
Signage	0.657	No
Relevancy	0.653	No
User-friendliness	0.636	No
Navigability	0.329	No
Control	0.228	No
Consistency	0.224	No
Access time	0.161	No
Recognition	0.104	No
Readability	0.076	No

Fig. 55. Table showing mean comparisons for current views at UoS and CU

These comparisons show that the null hypothesis that there is no difference between the means at each of the libraries can be retained in the vast majority of cases, or in other words the results from the three libraries are similar. The two exceptions to this are the usability properties readability and consistency when comparing UoWL and CU.

5.2.5 Perceived importance of usability properties when using the university library

The fourth section of the questionnaire asked for participants' views of the importance of each of the 12 usability properties with regard to using the university library and its systems such as the website, catalogue, self-service issue machines, library databases and e-journals. As with the previous section, this was done via a series of 13 Likert scale questions where the scale was as follows:

- 5 = strongly agree
- 4 = agree
- 3 = neither agree or disagree
- 2 = disagree
- 1 = strongly disagree

i) Q1. How important is simplicity (the library is simple and straight-forward to use ?

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q1	120	3	5	4.50	0.635

Fig. 56. Table showing results for Q1 across the 3 universities

Then looking at each of the universities individually:

Q1	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	3	5	4.43	0.712
CU	40	3	5	4.58	0.549
UoS	40	3	5	4.50	0.641

Fig. 57. Table showing results for Q1 at each university

ii) Q2. How important is comfort (being at ease using the library) ?

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q2	120	2	5	4.38	0.723

Fig. 58. Table showing results for Q2 across the 3 universities

Then looking at each of the universities individually:

Q2	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	2	5	4.30	0.758
CU	40	2	5	4.45	0.783
UoS	40	3	5	4.38	0.628

Fig. 59. Table showing results for Q2 at each university

iii) Q3. How important is user-friendliness (the library is easy to use and user-friendly) ?

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q3	120	2	5	4.38	0.723

Fig. 60. Table showing results for Q3 across the 3 universities

Then looking at each of the universities individually:

Q3	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	2	5	4.30	0.758
CU	40	2	5	4.45	0.783
UoS	40	3	5	4.38	0.628

Fig. 61. Table showing results for Q3 at each university

iv) Q4. How important is user control (being in control of actions in the library, knowing what to do ?

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q4	120	1	5	4.27	0.807

Fig. 62. Table showing results for Q4 across the 3 universities

Then looking at each of the universities individually:

Q4	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	1	5	4.28	0.933
CU	40	2	5	4.23	0.768
UoS	40	3	5	4.30	0.723

Fig. 63. Table showing results for Q4 at each university

v) Q5. How important is readability (readable and uncluttered Information in the library)?

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q5	120	2	5	4.48	0.698

Fig. 64. Table showing results for Q5 across the 3 universities

Then looking at each of the universities individually:

Q5	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	2	5	4.40	0.810
CU	40	2	5	4.53	0.679
UoS	40	3	5	4.53	0.599

Fig. 65. Table showing results for Q5 at each university

vi) Q6. How important is adequacy/task match (adequate information in the library)?

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q6	120	3	5	4.53	0.593

Fig. 66. Table showing results for Q6 across the 3 universities

Then looking at each of the universities individually:

Q6	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	3	5	4.45	0.597
CU	40	3	5	4.58	0.594
UoS	40	3	5	4.58	0.594

Fig. 67. Table showing results for Q6 at each university

vii) Q7. How important is navigability (being able to easily find one's way around in the library)?

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q7	120	2	5	4.37	0.721

Fig. 68. Table showing results for Q7 across the 3 universities

Then looking at each of the universities individually:

Q7	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	3	5	4.48	0.640
CU	40	2	5	4.28	0.751
UoS	40	2	5	4.35	0.770

Fig. 69. Table showing results for Q7 at each university

viii) Q8. How important is recognition (being able to understand/ recognise the features and functions of the library)?

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q8	120	2	5	4.19	0.714

Fig. 70. Table showing results for Q8 across the 3 universities

Then looking at each of the universities individually:

Q8	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	3	5	4.38	0.540
CU	40	2	5	4.03	0.832
UoS	40	3	5	4.18	0.712

Fig. 71. Table showing results for Q8 at each university

ix) Q9. How important is access time (being able to find information in a reasonable time in the library)?

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q9	120	2	5	4.37	0.819

Fig. 72. Table showing results for Q9 across the 3 universities

Then looking at each of the universities individually:

Q9	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	3	5	4.38	0.667
CU	40	3	5	4.50	0.716
UoS	40	2	5	4.23	1.025

Fig. 73. Table showing results for Q9 at each university

x) Q10. How important is relevancy (the information I get from the library is relevant?

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q10	120	3	5	4.66	0.494

Fig. 74. Table showing results for Q10 across the 3 universities

Then looking at each of the universities individually:

Q10	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	3	5	4.58	0.549
CU	40	4	5	4.65	0.483
UoS	40	4	5	4.75	0.439

Fig. 75. Table showing results for Q10 at each university

xi) Q11. How important is consistency (words, terms and actions in in the library being consistent)?

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q11	120	1	5	4.13	0.846

Fig. 76. Table showing results for Q11 across the 3 universities

Then looking at each of the universities individually:

Q11	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	2	5	4.28	0.784
CU	40	2	5	4.08	0.797
UoS	40	1	5	4.03	0.947

Fig. 77. Table showing results for Q11 at each university

xii) Q12. How important is visual presentation (signage and text grabs your attention in the library)?

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q12	120	1	5	3.84	0.889

Fig. 78. Table showing results for Q12 across the 3 universities

Then looking at each of the universities individually:

Q12	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	1	5	4.03	0.974
CU	40	2	5	3.83	0.781
UoS	40	2	5	3.68	0.888

Fig. 79. Table showing results for Q12 at each university

xiii) Q13. How important overall is a good user experience/ usability in your university library?

Results for all 120 responses for this question are as follows:

	N=	Minimum	Maximum	Mean	Standard deviation
Q13	120	3	5	4.55	0.563

Fig. 80. Table showing results for Q13 across the 3 universities

Then looking at each of the universities individually:

Q13	N=	Minimum	Maximum	Mean	Standard deviation
UoWL	40	3	5	4.53	0.554
CU	40	3	5	4.60	0.591
UoS	40	3	5	4.53	0.554

Fig. 81. Table showing results for Q13 at each university

xv) Ranking the usability properties

Using these results it is possible to show how the participants rank the 12 usability properties in terms of their perceived importance. For all participants (n=120) the properties were ranked as follows:

Ranking	Usability Property	Mean	Standard Deviation
1.	Relevancy	4.66	0.494
2.	Adequacy/task match	4.53	0.593
3.	Simplicity	4.50	0.635
4.	Readability	4.48	0.698
5.	Comfort	4.38	0.723
5=	User-friendliness	4.38	0.723
7.	Navigability	4.37	0.721
7=	Access time	4.37	0.819
9.	Control	4.27	0.807
10.	Recognition	4.19	0.714
11.	Consistency	4.13	0.846
12.	Visual presentation	3.84	0.889

Fig. 82. Table showing usability property rankings for perceived importance from all participants

Looking at the rankings by university, firstly at UoWL (n=40), the properties were ranked for perceived importance as follows:

Ranking	Usability Property	Mean	Standard Deviation
1.	Relevancy	4.58	0.549
2.	Navigability	4.48	0.640
3.	Adequacy/task match	4.45	0.597
4.	Simplicity	4.43	0.712
5.	Readability	4.40	0.810
6.	Recognition	4.38	0.540
6=	Access time	4.38	0.667
8.	Comfort	4.30	0.758
8=	User-friendliness	4.30	0.758
8=	Control	4.30	0.723
11.	Consistency	4.28	0.784
12.	Visual presentation	4.03	0.974

Fig. 83. Table showing usability property rankings for perceived importance at UoWL

Secondly the rankings at CU (n=40):

Ranking	Usability Property	Mean	Standard Deviation
1.	Relevancy	4.65	0.483
2.	Simplicity	4.58	0.549
2=	Adequacy/task match	4.58	0.594
4.	Readability	4.53	0.679
5.	Access time	4.50	0.716
6.	Comfort	4.45	0.783
6=	User-friendliness	4.45	0.783
8.	Navigability	4.28	0.751
9.	Control	4.23	0.768
10.	Consistency	4.08	0.797
11.	Recognition	4.03	0.832
12.	Visual presentation	3.83	0.781

Fig. 84. Table showing usability property rankings for perceived importance at CU

And finally UoS (n=40):

Ranking	Usability Property	Mean	Standard Deviation
1.	Relevancy	4.75	0.439
2.	Adequacy/task match	4.58	0.594
3.	Readability	4.53	0.599
4.	Simplicity	4.50	0.641
5.	Comfort	4.38	0.628
6.	User-friendliness	4.38	0.628
7.	Navigability	4.35	0.770
8.	Control	4.30	0.723
9.	Access time	4.23	1.025
10.	Recognition	4.18	0.712
11.	Consistency	4.03	0.947
12.	Visual presentation	3.68	0.888

Fig. 85. Table showing usability property rankings for perceived importance at UoS

The results show that participants at each of the libraries have high expectations in the areas of relevancy, adequacy and simplicity with these three properties featuring at or near to the top of each list of rankings. In other words, their highest expectations of using the library are that they find information relevant to their needs, the information they do find is adequate for their needs, and also the library is simple and straightforward for them to use. The two properties which are least important to participants across the three libraries are consistency and visual presentation meaning that it is less important that the words, terms and actions used in the library are consistent, or that there is signage and text to grab their attention. Clearly participants are most concerned with the information they access within their libraries.

It is then possible to compare the mean value for each usability property at each university library with the mean value of the same property at the other libraries. For example, comparing the mean value for the perceived importance of navigability at CU with the mean value for the perceived importance of navigability at UoWL. This is done by using the Mann-Whitney U test. The null hypothesis for this test is that there is no difference between the means at each of the libraries.

Firstly for UoWL and CU:

Usability Property	**Significance value**	**Significant difference between means? (p<0.05)**
Relevancy	0.591	No
Readability	0.553	No
Control	0.499	No
User-friendliness	0.499	No
Simplicity	0.435	No
Adequacy	0.296	No
Access time	0.292	No
Comfort	0.262	No
Navigability	0.232	No
Consistency	0.227	No
Signage	0.149	No
Recognition	0.059	No

Fig. 86. Table showing mean comparisons for perceived importance at UoWL and CU

Secondly for UoWL and UoS:

Usability Property	Significance value	Significant difference between means? (p<0.05)
Access time	0.945	No
Comfort	0.802	No
Control	0.769	No
Simplicity	0.699	No
Readability	0.678	No
Navigability	0.544	No
User-friendliness	0.425	No
Adequacy	0.296	No
Consistency	0.242	No
Recognition	0.233	No
Relevancy	0.139	No
Signage	0.051	No

Fig. 87. Table showing mean comparisons for perceived importance at UoWL and UoS

And finally for UoS and CU:

Usability Property	Significance value	Significant difference between means? (p<0.05)
Adequacy	1.000	No
Consistency	0.971	No
User-friendliness	0.922	No
Readability	0.841	No
Control	0.698	No
Simplicity	0.693	No
Navigability	0.579	No
Signage	0.505	No
Recognition	0.457	No
Comfort	0.347	No
Relevancy	0.332	No
Access time	0.314	No

Fig. 88. Table showing mean comparisons for perceived importance at UoS and CU

These comparisons show that the null hypothesis that there is no difference between the means at each of the libraries can be retained in the vast majority of cases, or in other words the results from the three libraries are similar.

5.2.6 Difference between current views of and perceived importance of usability properties

The calculation of mean scores for current views of and perceived importance of the 12 usability properties allows the calculation of the differences or gap between the two means for all participants (n=120) as follows:

Ranking	Usability Property	Current views mean (A)	Perceived importance mean (B)	Gap between means (A-B)
1.	Adequacy/task match	3.86	4.53	-0.67
2.	Access time	3.76	4.37	-0.51
3.	Readability	4.00	4.48	-0.48
4.	Relevancy	4.28	4.66	-0.38
5.	Recognition	3.83	4.19	-0.36
6.	Simplicity	4.25	4.50	-0.25
7.	Navigability	4.13	4.37	-0.24
8.	Consistency	3.90	4.13	-0.23
9.	Control	4.14	4.27	-0.13
10.	Comfort	4.35	4.38	-0.03
10=	User-friendliness	4.35	4.38	-0.03
12.	Visual presentation	3.86	3.84	+0.02

Fig. 89. Table showing gaps between means of current views and perceived importance for all participants

This shows that the largest gaps between participants' experience of using their libraries and their expectations occur with the usability properties:

- Adequacy/task match
- Access time
- Readability

And the smallest gaps occur with the usability properties:

- Visual presentation
- User-friendliness
- Comfort

Comparison of the mean values (current view mean values and perceived importance mean values) using the Wilcoxon signed rank test, shows that the means of the following eight usability properties are significantly different:

- Simplicity (p=0.001)
- Readability (p=0.000)
- Adequacy/task match (p=0.000)
- Navigability (p=0.016)
- Recognition (p=0.000)
- Access time (p=0.000)
- Relevancy (p=0.000)
- Consistency (p=0.020)

The means of the following four usability properties are not significantly different:

- Comfort (p=0.821)
- User-friendliness (p=0.262)
- Control (p=0.127)
- Visual presentation (p=0.836)

i) UoWL

The calculation of mean scores for current views of and perceived importance of the 12 usability properties allows the calculation of the differences or gap between the two means at UoWL (n=40) as follows:

Ranking	Usability Property	Current views mean (A)	Perceived importance mean (B)	Gap between means (A-B)
1.	Recognition	3.68	4.38	-0.70
2.	Consistency	3.63	4.28	-0.65
3.	Adequacy/task match	3.85	4.45	-0.60
4.	Readability	3.83	4.40	-0.57
5.	Access time	3.85	4.38	-0.53
6.	Navigability	4.00	4.48	-0.48
7.	Relevancy	4.15	4.58	-0.43
8.	Simplicity	4.13	4.43	-0.30
9.	Visual presentation	3.78	4.03	-0.25
10.	Control	4.15	4.30	-0.15
10=	User-friendliness	4.18	4.30	-0.12
12.	Comfort	4.23	4.30	-0.07

Fig. 90. Table showing gaps between means of current views and perceived importance at UoWL

Therefore the largest gaps at UoWL occur in the areas of:

- Recognition
- Consistency
- Adequacy/task match

While the smallest gaps occur in the areas of:

- Comfort
- User-friendliness
- Control

Comparison of the mean values (current view mean values and perceived importance mean values) using the Wilcoxon signed rank test, shows that the means of the following eight usability properties are significantly different:

- Simplicity (p=0.048)
- Readability (p=0.001)
- Adequacy/task match (p=0.001)
- Navigability (p=0.017)
- Recognition (p=0.000)
- Access time (p=0.000)
- Relevancy (p=0.003)
- Consistency (p=0.000)

The means of the following four usability properties are not significantly different:

- Comfort (p=0.706)
- User-friendliness (p=0.180)
- Control (p=0.431)
- Visual presentation (p=0.215)

ii) CU

The calculation of mean scores for current views of and perceived importance of the 12 usability properties allows the calculation of the differences or gap between the two means at CU (n=40) as follows:

Ranking	Usability Property	Current views mean (A)	Perceived importance mean (B)	Gap between means (A-B)
1.	Adequacy/task match	3.90	4.58	-0.68
2.	Access time	3.95	4.50	-0.55
3.	Readability	4.23	4.53	-0.30
3=	Relevancy	4.35	4.65	-0.30
5.	Simplicity	4.35	4.58	-0.23
6.	Control	4.03	4.23	-0.20
7.	Navigability	4.25	4.28	-0.03
8.	Comfort	4.43	4.45	-0.02
9.	User-friendliness	4.45	4.45	0
10.	Recognition	4.05	4.03	+0.02
10=	Visual presentation	3.85	3.83	+0.02
12.	Consistency	4.18	4.08	+0.10

Fig. 91. Table showing gaps between means of current views and perceived importance at CU

Therefore the largest gaps at CU occur in the areas of:

- Adequacy/task match
- Access time
- Readability
  =Relevancy

While the smallest gaps occur in the areas of:

- Consistency
- Visual presentation
- Recognition

Comparison of the mean values (current view mean values and perceived importance mean values) using the Wilcoxon signed rank test, shows that the means of the following five usability properties are significantly different:

- Simplicity (p=0.049)
- Readability (p=0.007)
- Adequacy/task match (p=0.000)
- Access time (p=0.003)
- Relevancy (p=0.011)

The means of the following seven usability properties are not significantly different:

- Comfort (p=0.837)
- User-friendliness (p=1.000)
- Control (p=0.137)
- Navigability (p=0.860)
- Recognition (p=0.856)
- Consistency (p=0.442)
- Visual presentation (p=0.839)

iii) UoS

The calculation of mean scores for current views of and perceived importance of the 12 usability properties allows the calculation of the differences or gap between the two means at UoS (n=40) as follows:

Ranking	Usability Property	Current views mean (A)	Perceived importance mean (B)	Gap between means (A-B)
1.	Adequacy/task match	3.83	4.58	-0.75
2.	Access time	3.70	4.23	-0.53
3.	Navigability	3.83	4.35	-0.52
4.	Recognition	3.75	4.18	-0.43
5.	Relevancy	4.33	4.75	-0.42
6.	Readability	4.25	4.53	-0.28
7.	Simplicity	4.28	4.50	-0.22
8.	Consistency	3.90	4.03	-0.13
9.	Control	4.25	4.30	-0.05
10.	Comfort	4.40	4.38	+0.02
10=	User-friendliness	4.40	4.38	+0.02
12.	Visual-presentation	3.95	3.68	+0.27

Fig. 92. Table showing gaps between means of current views and perceived importance at UoS

Therefore the largest gaps at UoS occur in the areas of:

- Adequacy/task match
- Access time
- Navigability

While the smallest gaps occur in the areas of:

- Visual presentation
- User-friendliness
- Comfort

Comparison of the mean values (current view mean values and perceived importance mean values) using the Wilcoxon signed rank test, shows that the means of the following five usability properties are significantly different:

- Readability (p=0.000)
- Adequacy/task match (p=0.000)
- Recognition (p=0.011)
- Access time (p=0.002)
- Relevancy (p=0.001)

The means of the following seven usability properties are not significantly different:

- Simplicity (p=0.088)
- Comfort (p=0.835)
- User-friendliness (p=0.572)
- Control (p=0.747)
- Navigability (p=0.168)
- Consistency (p=0.520)
- Visual presentation (p=0.103)

5.2.7 Participant comments section

The final section of the questionnaire gave participants the opportunity to express any other user experience or usability issues that they had encountered in the university library. Six themes were identified in total:

- E-resources
- Information needs
- Library stock
- Praise for the library
- Technology
- Library environment

The first of these, E-resources refers to comments regarding the library website, the electronic journals and databases, and also to e-books. For example a participant at CU found the library website unappealing to use because of the large amount of text it contains. Information needs relates to matters about how library users find information in the library, and an example of this is that at UoS a participant said that they would like to see more staff in the library, particularly walking around the building. The third theme, Library stock is about physical library resources and there were participants at each library who commented about a lack of some key text books. There were also a number of participants who chose to praise particular aspects of the library even though they were not prompted to do so, and therefore Praise is the fourth theme. The theme of Technology refers to matters such as participants believing there are too few PCs in the library building, while the last theme Library environment covers comments such as those received at CU and UoWL stating that the seating in the library is uncomfortable.

i) UoWL

At UoWL comments were received from 31 of the 40 questionnaire participants, with 55 comments being received in total. The most popular comment was that sometimes the PCs in the library do not work properly, which was mentioned by five participants. Four participants were concerned about there being too few printers available in the library with two participants stating that this is a particular problem when assignments are due in, and another participant mentioned that the printers tend to become “jammed” on a regular basis. The noise levels within the library are a problem for three of the participants, with one singling out the fourth floor group work area as being the worst area. Linked to the comments regarding noise, one participant believes a larger area should be set aside for silent study, while another commented that the second floor of the library, which is where the bulk of the library’s PCs are situated, can be extremely busy. Participants at UoWL did not give any comments to praise the library.

There are seven comments which can be considered to be related to the theme of E-resources. These are:

- Databases and e-journals are difficult to use (1 occurrence)
- More e-books are required (1 occurrence)
- The e-books are difficult to use (1 occurrence)
- The library website is confusing (1 occurrence)
- The library website is old-fashioned (1 occurrence)
- The library website should mention any new stock items (1 occurrence)
- The home page of the library website needs a search box (1 occurrence)

For the theme of Information needs, seven comments were made:

- The library is initially difficult to use (1 occurrence)
- There should be a recorded message in the lift explaining what is available on each floor (1 occurrence)
- The classification system does not make sense e.g. research books are at different locations (1 occurrence)
- It is not clear what is available on each floor (1 occurrence)
- Staff need to “keep an eye” on what goes on so that library is not used as a social space (1 occurrence)
- It should be clearer which are quiet or silent study areas (1 occurrence)
- There can be a long wait at the library helpdesk as there’s only one person dealing with enquiries (1 occurrence)

The theme of Library stock attracted six comments, and these are:

- There should be more copies of key text books (2 occurrences)
- There is sometimes a shortage of 3-week loan books (2 occurrences)
- It can be difficult to find a book on the shelves (2 occurrences)
- Some law text books have had pages of cases removed (1 occurrence)

- Text books in the field of computing need to be more advanced (1 occurrence)
- There should be a wider range of journals such as “Nature” and “Science” (1 occurrence)

The problems mentioned earlier regarding PCs not working and there being too few printers both fall under the Technology theme. Other comments made with this theme are:

- There should be more PCs in the library (3 occurrences)
- Problems to do with logging onto computers take too long to resolve (2 occurrences)
- It should be possible to take a screen print from the catalogue screen (1 occurrence)
- The catalogue would be better if it was a touch screen system (1 occurrence)
- More catalogue terminals are needed (1 occurrence)
- There should be a wider range of media equipment available such as scanners (1 occurrence)
- The library systems do not seem to be Integrated and consistent (1 occurrence)

The final theme Environment attracted the comments regarding library noise levels as well as a number of other comments:

- There should be more space set aside for practising presentations (2 occurrences)
- The library building should have longer opening hours (1 occurrence)
- The bookshelves are often “messy” (1 occurrence)
- PCs should be more spread around the building (1 occurrence)
- PCs should be away from the bookshelves e.g. the second floor (1 occurrence)

- The library seating is uncomfortable (1 occurrence)
- It is difficult for disabled people to reach the high shelves (1 occurrence)
- The library is not wheelchair friendly (1 occurrence)
- There should be lockers available to store belongings (1 occurrence)

To summarise, the following list shows the number of comments received for each of the themes (55 in total):

- Technology 19 comments
- Library environment 13 comments
- Library stock 9 comments
- E-resources 7 comments
- Information needs 7 comments
- Praise for the library 0 comments

ii) CU

At CU comments were received from 23 of the 40 questionnaire participants, with 43 comments received in total. Six participants commented that there are not enough PCs available in the library making this the most commonly occurring comment, while four participants would like longer opening hours for the library, especially at the weekend. There were three comments regarding there being a lack of some text books, while another participant, an aerospace engineering student, believes that some of the text books in the library are simply too old and gave the example of some having been published in the 1960s. Three comments were also received in praise of the library, with two of these being that the library staff are friendly and helpful, and another that visiting the library is a good experience.

There are six comments which can be considered to be related to the theme of E-resources. These are:

- More e-books are required (2 occurrences)
- The library website is unappealing with too much text (1 occurrence)
- The catalogue is difficult to use initially (1 occurrence)
- The e-resources have a lack of full text articles (1 occurrence)
- The databases can be difficult to use – it is not clear how to create search terms (1 occurrence)
- It is difficult to find electronic copies of theses from the 1980s and 1990s (1 occurrence)

The theme of Information needs attracted three comments:

- Staff training is not consistent for example only one of two staff members can assist with Refworks queries (1 occurrence)
- Some subject areas have their own library which is confusing for students (1 occurrence)
- More information about the seminar rooms is required (1 occurrence)

The comments regarding a lack of and old text books belong to the theme of Library stock. Four other comments with this theme were received:

- Some journals are not available (1 occurrence)
- The journal display case has been removed (1 occurrence)
- There are not enough hardcopies of journals (1 occurrence)
- There are books listed on the catalogue as available which do not appear on the shelves (1 occurrence)

The theme of Technology received five comments in addition to the one regarding a lack of PCs in the library:

- The internet connection can be slow (1 occurrence)
- There can be problems printing e-resources (1 occurrence)

- Sometimes users get logged out of e-resources (1 occurrence)
- Some printers are black and white and some are colour but it is not clear which are which (1 occurrence)
- Links to inter-library loans may only last for 14 days (1 occurrence)

The final theme, Environment, attracted seven comments which includes the comment regarding longer opening hours. The other six comments were:

- The temperature of the building is too cold in winter (1 occurrence)
- There should be blinds covering the windows (1 occurrence)
- The library's quiet area can be noisy (1 occurrence)
- The library building is too small for the number of students who use it (1 occurrence)
- The chairs are uncomfortable (1 occurrence)
- There should be classification marks on both ends of the shelves (1 occurrence)

To summarise, the following list shows the number of comments received for each of the themes (43 in total):

- Technology 12 comments
- Library environment 10 comments
- Library stock 8 comments
- E-resources 7 comments
- Information needs 3 comments
- Praise for the library 3 comments

iii) <u>UoS</u>

At UoS, comments were received from 31 of the 40 questionnaire participants with 62 comments received in total. The comment that was made most

frequently, a total of seven times, was that participants would like longer opening hours with some stating that 24-hour opening is required throughout vacation periods. Other frequently occurring comments were that people tend to talk in the quiet and silent study areas of the library, which was mentioned by five participants, and that the library is often very crowded with not enough workspaces, also mentioned by five participants. A total of five participants find it difficult to locate dissertations both on the shelves and on the catalogue, but there were six comments in praise of the library with three participants saying that the library is a good experience, and a further three commenting that the library staff are friendly.

The theme of E-resources attracted three comments, and these were:

- There is a lack of full-text journal articles (3 occurrences)
- The databases and Summon search engine (2 occurrences)
- E-books are difficult to use (2 occurrences)

Two comments regarding Information needs were received:

- More information regarding what can be done In the library is required (1 occurrence)
- There should be more staff at the information desk or walking around in the library to assist users (1 occurrence)

There were five comments with the theme of Library stock. One of these concerned the difficulties regarding locating copies of dissertations, and the other four are:

- Book titles are listed on the catalogue as available but the books are not on the shelves or trolleys (4 occurrences)
- There is a lack of key text books (3 occurrences)
- It is difficult to locate books on the shelves (3 occurrences)

- Some books are old - new editions are needed (1 occurrence)

The Technology theme has six comments, and these are:

- The printers sometimes run out of paper or do not work (2 occurrences)
- There can be issues with the wireless internet connection meaning that laptops cannot connect (1 occurrence)
- The cards for printing sometimes do not work (1 occurrence)
- The system for booking group work rooms is slow and difficult to use (1 occurrence)
- Scanning items using the printer is difficult (1 occurrence)
- The self-service machines for issuing and returning books are easy to use (1 occurrence)

Finally, there were seven comments regarding the theme of Library environment. Three of these were the ones mentioned previously – longer opening hours, talking in quiet areas, and a lack of workspaces, with the other four being:

- Some desks are more comfortable and suitable for working at than others (3 occurrences)
- Some group study rooms are next to silent study areas and this can create noise problems (2 occurrences)
- There should be more areas set aside for eating and drinking (1 occurrence)
- Signage in the old part of the library building is not as good as in the new part (1 occurrence)

To summarise, the following list shows the number of comments received for each of the themes (62 in total):

- Library environment 24 comments
- Library stock 16 comments
- Technology 7 comments
- E-resources 7 comments
- Praise for the library 6 comments
- Information needs 2 comments

5.3 The library policy survey

One hundred and twenty-one university library websites were surveyed both quantitatively and qualitatively to investigate the policies they have in place. There was then a follow-up survey of a number of university libraries to try to ascertain whether library policies always appear on the library's website, and whether the libraries have any type of user experience or usability policy in place.

5.3.1 Quantitative results

This part of the survey investigated which policies each library had in place. The universities were each classified as a particular type of university – Ancient, Red-brick, Plate-glass, New, University College, University of London, University of Wales or a Unique Institution. The frequency of each of these types was as follows:

n=121

Type	Frequency	Percentage
New	57	47.1%
Plate-glass	20	16.5%
Red-brick	19	15.7%
University of London	8	6.6%
Ancient	7	5.8%
University College	5	4.1%
University of Wales	2	1.7%
Unique Institution	2	1.7%
Other	1	0.8%

Fig. 93. Table showing survey frequency of university types

For the three universities chosen as survey sites, UoWL is type New, CU is Other, and UoS is Plate-glass.

i) Library mission policy

Forty-nine libraries or 40.5% have a library mission policy covering the aims and strategy of the libraries while 72 libraries or 59.5% do not have this type of policy.

Looking at university type regarding this policy gives the following results. For example 57.1% of all type Ancient universities have a library mission policy:

n=121

Type	Frequency of policy	Percentage of type
Other	1	100%
University of London	7	87.5%
Ancient	4	57.1%
Red-brick	9	47.4%
Plate-glass	9	42.9%
New	18	31.6%
University College	1	20%
University of Wales	0	0%
Unique Institution	0	0%

Fig. 94. Table showing survey frequency of library mission policy for each university type

This suggests that generally the more traditional types of universities tend to be more likely to have this type of policy e.g. University of London and Ancient universities while less than a third of New universities have this policy in place.

Of the three survey sites, only CU has this policy.

ii) **Collection development policy**

Fifty-four libraries or 44.6% have a library collection development policy covering what the library stocks in terms of both electronic and physical items, while 67 libraries or 55.4% do not have this type of policy.

Then looking at university type regarding this policy gives the following results:

n=121

Type	Frequency of policy	Percentage of type
Other	1	100%
Unique Institution	0	0%
University of London	7	87.5%
Red-brick	11	57.9%
Ancient	4	57.1%
Plate-glass	12	57.1%
New	18	31.6%
University College	1	20%
University of Wales	0	0%

Fig. 95. Table showing survey frequency of library collection development policy for each university type

Again, the more traditional types of universities tend to be more likely to have this type of policy e.g. University of London and Red-brick universities, while less than a third of New universities have this policy in place.

Of the three survey sites, only UoS has this policy.

iii) **Customer charter policy**

Forty-nine libraries or 40.5% have a customer charter policy covering how the library will treat its customers in terms of standards and customer care, while 72 libraries or 59.5% do not have this type of policy.

Then looking at university type regarding this policy gives the following results:

n=121

Type	**Frequency of policy**	**Percentage of type**
Other	1	100%
Red-brick	10	52.6%
Plate-glass	10	47.6%
New	23	40.4%
Ancient	2	28.6%
University of London	2	25%
University College	1	20%
Unique Institution	0	0%
University of Wales	0	0%

Fig. 96. Table showing survey frequency of customer charter policy for each university type

UoWL and CU have this policy, while UoS does not.

iv) **Library Website policy**

Only three libraries or 2.5% have a website policy covering how the library designs and maintains its website and whether it follows usability and user experience principles such as carrying out usability testing or gathering user feedback, while 118 libraries or 97.5% do not have this type of policy.

Then looking at university type regarding this policy gives the following results:

n=121

Type	Frequency of policy	Percentage of type
Other	1	100%
Ancient	1	14.3%
Red-brick	0	0%
New	1	3.5%
Plate-glass	0	0%
University of London	0	0%
University College	0	0%
Unique Institution	0	0%
University of Wales	0	0%

Fig. 97. Table showing survey frequency of website policy for each university type

None of the three survey sites have this policy.

v) **Library regulations policy**

Eighty-four libraries or 69.4% have a library regulations policy covering the rules and regulations of the library that library users are expected to abide by, while 37 libraries or 30.6% do not have this type of policy.

Then looking at university type regarding this policy gives the following results:

n=121

Type	Frequency of policy	Percentage of type
Ancient	7	100%
Unique Institution	1	100%
University of London	8	100%
Plate-glass	18	85.7%
Red-brick	16	84.2%
New	34	59.6%
Other	0	0%
University College	0	0%
University of Wales	0	0%

Fig. 98. Table showing survey frequency of library regulations policy for each university type

This policy is popular amongst most university types, but particularly more traditional ones.

Of the three survey sites, CU and UoS have this policy, while UoWL does not.

vi) **Library Computing policy**

Thirty-nine libraries or 32.8% have a computing policy covering the rules and regulations for using the library's computer and acceptable use of them, while 82 libraries or 67.8% do not have this type of policy.

Then looking at university type regarding this policy gives the following results:

n=121

Type	Frequency of policy	Percentage of type
Red-brick	8	42.1%
University of London	3	37.5%
Plate-glass	7	35.0%
New	19	33.3%
Ancient	2	28.6%
University College	0	0%
Unique Institution	0	0%
University of Wales	0	0%
University of Wales	0	0%

Fig. 99. Table showing survey frequency of library computing policy for each university type

Of the three survey sites, UoWL and UoS both have this policy.

vii) **Library access policy**

One-hundred-and-four libraries or 86% have a library access policy covering the rules for who can use the library and what they can do in terms of borrowing items, while 17 libraries or 14% do not have this type of policy.

Then looking at university type regarding this policy gives the following results:

n=121

Type	Frequency of policy	Percentage of type
University College	5	100%
Unique Institution	1	100%
University of London	8	100%
University of Wales	2	100%
Red-brick	18	94.7%
Ancient	6	85.7%
Plate-glass	18	85.7%
New	46	80.7%
Other	0	0%

Fig. 100. Table showing survey frequency of library access policy for each university type

This is a highly popular policy amongst all but one of the university types. All three of the survey sites have this policy.

ix) **Summary**

To summarise, the following list shows the order of popularity of the policies, and the percentages involved across the 121 university libraries and seven types of policies:

1. Library access policy 86%
2. Library regulations policy 69.4%
3. Collection development policy 44.6%
4. Library mission policy 40.5%

4= Customer charter policy 40.5%

6. Library computing policy 32.8%
7. Library website policy 2.5%

None of the libraries has all seven policies, and five libraries have none of the policies. The following list shows the number of libraries having zero to seven policies (n=121):

- 7 policies - 0 libraries
- 6 policies - 6 libraries
- 5 policies - 22 libraries
- 4 policies - 27 libraries
- 3 policies - 26 libraries
- 2 policies - 14 libraries
- 1 policy - 21 libraries
- 0 policies - 5 libraries

The six libraries that have six of the policies are:

- Queen Margaret University (New)
- University of Glamorgan (New)
- Aston University (Plate-glass)
- Aberystwyth University (Red-brick)
- University of Leeds (Red-brick)
- University of Nottingham (Red-brick)

While the five libraries that have none of the policies on their respective websites are:

- Buckinghamshire New University (New)
- Edge Hill University (New)
- Robert Gordon University (New)
- University of Northampton (New)
- University of Birmingham (Red-brick)

Of the three survey sites, UoWL has three of the policies:

- Customer charter policy
- Library computing policy
- Library access policy

CU has four policies:

- Library mission policy
- Customer charter policy
- Library access policy
- Library regulations policy

UoS also has four policies:

- Customer charter policy
- Library access policy
- Library regulations policy
- Library computing policy

5.3.2 Qualitative results

Each university website was also analysed for policies related to user experience or usability. It has already been seen that only three of the 121 libraries or 2.5%, have a website policy. However there were instances of references to user experience, user interfaces and usability and these were used as the three themes for this analysis.

i) User experience

The library of the University of Bolton has a statement regarding user experience under its Quality Assurance section of the website. It states:

> *"The library continually seeks to improve the 'user experience' and to fully involve users to this end"*

(University of Bolton, 2012).

One of Newcastle University's library strategic priorities combines user experience with emerging technologies and has the aim of:

> *"Developing services to enhance the student experience, and supporting excellent customer services with the potential provided by new technologies"*

(Newcastle University, 2012a).

The same institution also emphasises user experience in its customer care policy and pledges:

> *"We will put our users at the centre of our service"*

(Newcastle University, 2012b).

Other institutions with similar aims include University College London which includes student experience as a key performance area in its strategy, and Queen Mary, University of London which states that the library should *"play a leading role in enhancing the overall student experience"* (Queen Mary University, 2012).

De Montfort University library has a customer services statement promising a user-centred service:

> *"We will put our users at the centre of our service"*

(De Montfort University, 2012).

The University of Sheffield's library has as a theme of its strategic plan, the assurance of *"A great student experience"* (University of Sheffield, 2012), while Canterbury Christ Church University library's service level statement has enhancing the student experience through its study environment as one of its aims (Canterbury Christ Church University, 2012).

ii) User interfaces

One of the library objectives at the University of St Andrews covers user interfaces:

> *"Our intention is to develop interfaces to improve resource discovery and maximise the use of our collections"*

(University of St Andrews, 2012).

Similarly the library of Glasgow Caledonian University (2012) has amongst its planning objectives for 2010 to 2013, the aim to develop an interface which will

allow easy access to the library's various repositories, and Durham University library's collection management policy discusses the selection of electronic resources in its collection management policy, and the importance of the user interface:

> *"For electronic resources, selection criteria include the quality of the interface..."*

(Durham University, 2012).

iii) Usability

Four libraries were found to have this theme as part of their policies. One of the responsibilities of Library Services at Canterbury Christ Church University is to:

> *"Manage and develop online resources through user-friendly web-based provision"*

(Canterbury Christ Church University, 2012).

The library of the University of Cambridge has guidelines for the accessibility of its web pages and states:

> *"We favour the principles of usability and universal design which will be of benefit to all users"*

(University of Cambridge, 2012).

Manchester Metropolitan University's library has a policy for publishing material on its website. This policy emphasises that the website must be usable and lists a series of guidelines regarding accessibility, navigability, and legal matters. It also refers to the usability of third party software:

> "*The University would wish to see all web publishers adopt sensible approaches to accessibility and usability, but recognise that the University have no control over this"*

(Manchester Metropolitan University, 2012).

It is however Southampton Solent University's library which has the most comprehensive usability theme. Its library website policy specifies that the library portal should be user-focused and also consistent, clear, easy to use and interesting. Additionally the library pledges to follow web usability guidelines:

> *"The site will be up-to-date and of recognised quality throughout in accordance with accepted best practice in web design..."*

(Southampton Solent University, 2012).

The policy states that there should be a system in place for continuous evaluation of the library website, and that this will be done by for example carrying out usability surveys (Southampton Solent University, 2012).

5.3.3 Follow-up survey of university library policy results

This follow-up survey aimed to ascertain whether UK university library policies always appear on the library's website, and whether university libraries which do not have any type of user experience/usability policy on their website do in fact have one in place. It asked two questions:

1. Do all the library's policies appear on the library website?

2. Does [name of university] University library have a user experience policy, and if so what does it cover?

Of the 37 libraries contacted, 22 responded. These were:

- Kingston University
- University of the West of Scotland
- University of Edinburgh
- University of Cumbria
- University of Kent
- University of Leeds
- Queen's University, Belfast
- University of West London
- University of East London
- University of Winchester
- University College Falmouth
- Keele University
- University of Nottingham
- University of York
- University of Leicester

- Imperial College
- Leeds Trinity University
- University of Bath
- Canterbury Christ Church University
- University of Buckingham
- University of Southampton
- University of Oxford

In response to the first of the questions, “Do all the library’s policies appear on the library website”, the results were as follows:

n=22

Response	Number of responses	Percentage of responses
Yes	15	68.2%
No	7	31.8%

Fig.101. Table showing number and % of libraries where policies do and do not appear on website.

This shows that a large majority, more than two-thirds of the libraries contacted, display all of their policies on their website, while around 32%, or just under one-third, do not. Of the seven libraries who responded “No” to this question, there are three libraries which publish some policies on the library’s website and some policies on its intranet, and two libraries that present all of their policies on the library intranet. The other two libraries gave a response of “No” with no further details.

Some respondents gave very basic answers to the questions, but many of the libraries gave more comprehensive replies. For example, the universities of Edinburgh, Cumbria, Kent, Leeds, York, Leicester, Canterbury Christ Church, Buckingham and Oxford gave links to the relevant policy pages within their websites. The respondent from the University of Kent explained that there was a consultation regarding their policies taking place, and the respondent from the University of West London said that it was their aim to publish all of their policies on their website.

The second question asked if the library had a user experience policy, and if so what did it cover. Of the 22 responses received, none of the libraries claimed to have a user experience policy. However, Kingston University noted that they have a "*strategy for engaging with users"* which is published on their library intranet. Similarly, the University of Edinburgh responded that the library "*sets out the expectations it has for excellent user experience in its values statement"*.

A number of other interesting replies to this question were received:

> *"Currently we do not have such a policy, but it is something I would be very interested on working on. Your email is a timely reminder!"*

(University of the West of Scotland).

> *"…this is something that we would want to do"*

(University of West London).

> *"In March we began looking at user experience in much greater detail with staff attending the UXLibs conference in Cambridge, however it is still at a very early stage"*

(University of York).

> *"…we do quite a bit of usability testing on our services and facilities. We have very recently convened a staff group to look at UX and methods in more detail"*

(Imperial College).

> *"…our forthcoming service standards….are being developed in partnership with our users and will ensure that our users experience high standards in the library services that they value the most"*

(University of Nottingham).

> *"It may be that in future we will have a coordinated policy on user experience across the Bodleian Libraries. Where at all possible, we strive for excellence in terms of user experience"*

(University of Oxford).

> *"…this area is constantly under review so it's something we could possibly have in the future"*

(Canterbury Christ Church University).

The results from this question showed that while none of the libraries contacted have a user experience policy in place, there are a few libraries which were aware of this type of policy and were thinking about or moving towards having one in place.

5.4 Follow-up survey of university libraries outside the south of England

The aim of this follow-up survey was to gauge how representative the results of the library user survey at the three university libraries had been. The survey sites: Cranfield University, the University of Surrey and the University of West London are all in the south of England, but would other university libraries in other parts of the UK or in other regions of the world have similar results?

A summary of the survey results was sent to a small number of university libraries and the following question was posed:

> **How do you think the results would differ and how would they be similar if the survey was carried out at the [name of university] library**?

Responses were received from two libraries: the University of Edinburgh in Scotland and the University of Virginia in the USA.

5.4.1 The University of Edinburgh library

The response from the University of Edinburgh (UoE) library came from the Head of Help Services in the User Services Division.

The respondent believes that users at UoE library would rate it highly for information relevancy and similarly that they would rate it highly for adequacy of information, although there may be some differences between students in the different university schools. The respondent noted that the library is about to launch a new search platform which may help reduce access time to library materials.

Areas requiring improvement at the library are signage and simplicity, although the respondent noted that there are nine libraries at UoE, differing in size and complexity of layout, and that there could be differences between these.

The importance of library surveys was emphasised by the respondent: UoE library participates in Libqual+ surveys and carries out annual student experience surveys.

5.4.2 The University of Virginia library

The second response to the follow-up survey came from the Library Experience and User Experience Team Manager at the University of Virginia (UoV) library.

This library undertakes an annual user survey, and this has shown that users feel that the library is user-friendly. The respondent believes that library users at UoV would agree with the statements that:

- They feel at ease using the library (comfort)
- The library is user-friendly (user-friendliness)
- The library is simple to use (simplicity).

They would also be likely to feel dissatisfaction with the signage in the library, and currently the user experience team are currently working on *"addressing a need for compelling and consistent signage".*

Comments from the annual user survey at UoV suggest that users are often unaware of the services offered by the library leading the respondent to believe that users would tend to be less satisfied with the statement:

I quickly understand the features and functions of the library (recognition).

The respondent states that the concept of adequacy of information within the library differs greatly depending on the area of study. For example currency of information is very important in the sciences, and this impacts on users' perceptions of concepts of relevancy and adequacy. In the 2014 and 2015 annual user survey at UoV, there was reduced satisfaction regarding access to up-to-date information.

Finally, the usability property of "access time" would be likely to be rated fairly highly by users of UoV library according to the respondent. This is because the library's most popular service is a service by which requested materials are delivered directly to faculty offices. The respondent emphasises that the library has an *"extremely efficient"* interlibrary loan system.

5.4.3 Survey results

The respondent from UoE believes that users at the library would rate its libraries highly for relevancy and adequacy of information, while the respondent from UoV notes that in recent years these properties have been rated less highly. The survey of 120 users at the three survey sites of CU, UoS and UoWL showed that these are properties where some of the largest gaps between users' experiences and expectations exist. It would be interesting to ascertain whether a survey of UoE users would actually show high levels of satisfaction with these usability properties, or whether the results would concur with those at the three survey sites.

Both respondents think that visual presentation could be improved in their libraries which is in line with the results from the three survey sites. UoV is actively working on making improvements in this area.

Access time is a property with which users at the three survey sites expressed less satisfaction, and UoE is making changes to its search platform so that access time is reduced. At UoV however, the respondent believes that this property would be rated more highly due to the systems which are in place for the swift delivery of materials to users.

6. Discussion of Findings

6.1. The research questions

Chapter three discussed the research questions that this study aims to answer. There are four research questions and these are:

How do library users rate the usability of their university library and its systems?

How big is the gap between users' experience and expectations of using their university library and its systems?

Which type of policies do UK university libraries have, and do they have user experience or usability policies?

How can a user experience policy bridge the gap between users' experience and expectations of using their university library and its systems?

This chapter will consider each of these questions in relation to the results achieved, and will also look at future research to follow on from this study. The researcher will also make an assessment of the study and give her opinion of its strengths and weaknesses.

6.2 How do library users rate the usability of their university library and its systems?

The library usability questionnaire was carried at the three university libraries in order to answer this question.

University libraries differ significantly from one institution to another as the researcher confirmed during her visits to a number of these places. They range from the traditional, quieter types of libraries with narrow aisles bordered by high bookshelves such as at the University of Reading, to the modern types which are light, airy, open-plan buildings for example Cranfield University and Bucks New University. There are also the hybrids which mix the traditional with the modern as at the University of Surrey. It is likely that a participant's liking or dislike of the

library environment will influence their view of its usability in many ways. For example it may be more difficult to find a particular book on the high shelves of the older, more traditional bookshelves of some libraries, or there may be too much sunlight over desk areas in modern, bright library buildings.

Just as the places themselves differ, the students at the institutions also differ as analysis of the questionnaire participants shows. The participants at CU tended to be older due to that institution being a postgraduate one. These participants were also generally studying in scientific areas such as engineering and science, while those at UoWL tended to be studying in business-related areas: business studies, computing, and law. At UoS diverse subjects such as engineering, hospitality and accounting/finance were being studied. Clearly those studying will have different needs depending on what they are studying, and they will also have different ways of thinking about their library needs. For example computing students are likely to have an awareness of usability issues whereas a participant studying law or hospitality is unlikely to have the same level of awareness. Furthermore final year or postgraduate students may have higher expectations of their libraries due to their more intensive work schedules.

Similarly, the frequency of use of the library will impact the participant's opinion of its usability. Library use is high at all three universities, but the participants at CU and UoS use the library website on a much more frequent basis than at UoWL. It can be asked if this is because the website is hard to use, or does less frequent use make it harder to use?

Although it is possible to look at the results across the three libraries for the 120 participants, arguably this is not as valid as looking at each library individually because as discussed in the preceding paragraphs, while there will be many similarities between the libraries, they will also vary in many ways. In this way, each library can be considered a case within case study research. However as discussed in section 4.3.5, although similarly to case study research this study does not aim to generalise from the results, it cannot be considered true case study research as it lacks the holistic, in-depth nature of the case study method.

Using the Mann-Whitney U test, it was possible to see that there is very little difference between the mean scores of current views and of users and those of perceived importance across the three survey sites.

At each library, all participants were asked to rate the overall usability and user experience in their library. The mean scores at each library showed that participants agreed that the overall usability and user experience is good.

Participants at CU are the most satisfied with the usability of their library with the highest mean score for the statement “The overall user experience/usability in the library is good”. They also agreed with nine of the usability statements in the questionnaire. UoS participants were the next most satisfied when looking at the mean score for “The overall user experience/usability in the library is good”, while UoWL participants scored their library the lowest for this statement.

However these overall scores do not give the complete picture, and it can be argued that it is not enough to look at overall usability alone. By breaking down usability satisfaction levels into the 12 usability properties, a more detailed impression of user satisfaction can be gained and individual areas of concern or satisfaction can be identified.

At UoWL, the mean scores show that participants agree with the following six statements about the usability properties:

- I feel at ease using the library (Comfort)
- The library is user-friendly (User-friendliness)
- I feel in control of what I’m doing when using the library (Control)
- The information I get from the library is relevant (Relevancy)
- The university library is simple to use (Simplicity)
- I can find my way around the library with ease (Navigability)

However there are six statements which participants neither agreed nor disagreed with. These are:

- The information accessed in the library is adequate (Adequacy/task match)
- The information I access in the library is readable and uncluttered (Readability)
- Signage and text to grab my attention are present in the library (Visual presentation)
- I quickly understand the features and functions of the library (Recognition)
- I can find the information I need in a reasonable time (Access time)
- The consistency of terms, words and actions throughout the library is evident (Consistency)

At CU, mean scores show that participants agree with the following nine statements about the usability properties:

- The library is user-friendly (User-friendliness)
- I feel at ease using the library (Comfort)
- The university library is simple to use (Simplicity)
- The information I get from the library is relevant (Relevancy)
- I can find my way around the library with ease (Navigability)
- The information I access in the library is readable and uncluttered (Readability)
- The consistency of terms, words and actions throughout the library is evident (Consistency)
- I quickly understand the features and functions of the library (Recognition)

- I feel in control of what I'm doing when using the library (Control)

At CU there are only three statements which participants neither agreed nor disagreed with. These are:

- I can find the information I need in a reasonable time (Access time)
- The information accessed in the library is adequate (Adequacy/task match)
- Signage and text to grab my attention are present in the library (Visual presentation)

Finally, at UoS mean scores show that participants agree with the following six statements about the usability properties:

- I feel at ease using the library (Comfort)
- The library is user-friendly (User-friendliness)
- The information I get from the library is relevant (Relevancy)
- The university library is simple to use (Simplicity)
- I feel in control of what I'm doing when using the library (Control)
- The information I access in the library is readable and uncluttered (Readability)

Similarly, there are six statements at UoS which participants neither agreed nor disagreed with. These are:

- Signage and text to grab my attention are present in the library (Visual presentation)
- The consistency of terms, words and actions throughout the library is evident (Consistency)

- The information accessed in the library is adequate (Adequacy/task match)
- I can find my way around the library with ease (Navigability)
- I quickly understand the features and functions of the library (Recognition)
- I can find the information I need in a reasonable time (Access time)

There are five usability properties where the participants at each of the three libraries agree with the statements. These are:

- I feel at ease using the library (Comfort)
- The library is user-friendly (User-friendliness)
- The information I get from the library is relevant (Relevancy)
- The university library is simple to use (Simplicity)
- I feel in control of what I'm doing when using the library (Control)

These are therefore areas where the three libraries can feel more confident about the user experience being provided. Perhaps the most important property here is relevancy. Being able to find relevant information is a priority for library users, and can be seen as a core function of a library. For example research students tend to be interested in a very small area of study and need to delve deeply within this area. It is therefore vital that the information that they can access is relevant to their very particular needs.

Participants at the three university libraries tend to have usability concerns in the same areas. Adequacy/task match, visual presentation, and access time are areas of less satisfaction at all three libraries, while recognition and consistency are areas of lower satisfaction at both UoWL and UoS.

As with the need for relevant information, being able to find adequate information in a library is a priority for library users. The example of the research student who needs information relevant to his area of research can be expanded to also his need for adequate information in terms of content, recent publications, and

number of articles available to him. Being able to find this information in a reasonable time is also going to be important to all students, but arguably it is the younger, less experienced undergraduates who this will affect most as they can be considered the ones most likely to give up their searches for information if they do not find what they need in a reasonable time.

These three properties of adequacy/task match, relevancy and access time can thus be seen as core library functions. They are the areas where the library must excel in order to meet the needs of its users. There being suitable signage and text (visual presentation), recognising the features and functions of the library (recognition), and there being consistency of words, terms and actions (consistency), while still being important are arguably not as vital because they are related to the appearance of the library and are not among its core functions.

The follow-up survey of university libraries outside the south of England shows areas where library staff at the University of Edinburgh and the University of Virginia feel that there are similarities and differences with the results achieved at the three survey sites. Visual presentation is a usability property that respondents at both of these libraries feel needs to be improved, and this is similar to the findings at the three English universities. At UoE users would be likely to rate the library highly for adequacy and relevancy according to the respondent., but this is contrary to the results at the three English university libraries. At UoV the respondent believes that users would rate the usability property “access time” highly due to the systems that they have in place for delivery of material, but this is an area of less satisfaction at CU, UoWL and UoS.

While the results at the three English university libraries show similarities, these results from this follow-up survey highlight that it is difficult to generalise from the findings at a handful of survey sites as they do show some differences. However, it is important to note that the follow-up survey gives the views of library staff rather than library users. If the user survey had been carried out at UoE and UoV, this may have shown that user opinions are very different to the views of library staff, and may have shown similarities to the results at the three survey sites. Library staff will naturally want to feel pleased with the services they are providing for

users. However they may not be aware of the types of issues that users are facing or the aspects of the library and its systems and services where they are less satisfied.

By being able to see how participants at each of the three libraries rate each usability property, it is possible for the libraries to explore the problems surrounding them in more detail as a way towards improving the overall usability and user experience in the library.

6.3 How big is the gap between users' experience and expectations of using their university library and its systems?

In addition to looking at the mean scores for each of the 12 usability properties on the questionnaire, it is also possible to investigate the gap between users' experience and their expectations of using the university library and its systems. Investigating this gap is a way of analysing the "lived experience" of library users, and will highlight the usability properties that fall below users' expectations. Inglesant and Sasse's (2007) study of the usability of London transport systems discusses how lives can be disrupted by difficulties with systems and interfaces. While this may sound extreme, if a student does fail to connect with his university library systems, his whole university experience may be disrupted with serious consequences such as poorer grades than he is expecting.

However, it should not be assumed that users' expectations of their library will always be higher than their experience of using it, and at CU and UoS there are usability properties where users' current views do exceed expectations. These are recognition, visual presentation, and consistency at CU, and comfort, user-friendliness, and visual presentation at UoS. At both of these libraries, users do have slightly lower expectations of visual presentation rating it as "somewhat important", but the other properties are seen by users as "important", showing that participants have a good level of satisfaction in these areas. At UoWL, current views are lower than expectations across all of the usability properties meaning that the users at this library have the lowest levels of satisfaction for their library's usability. However, a brand new library facility is due to open at UoWL's Ealing site in Autumn 2015, and it is possible that levels of satisfaction amongst library users will improve.

At each of the three libraries the usability property adequacy/task match has one of the largest gaps between user expectations and experience. This is the usability property with the largest gap at both CU and UoS. The previous section (6.2) showed that adequacy has already been highlighted as one of the areas where participants are less satisfied with usability, and the gap analysis shows that participants have high expectations in this area. Koohang and Ondracek's (2005) study of users' views of the usability of digital libraries (which used the questionnaire on which the one used in this study is based) makes the point that the gap between users' experience and their expectations can be addressed in two ways: either by improving library's performance in particular areas, or by "*renegotiating the target".*

It is possible that the libraries in this study do need to make improvements in the area of adequacy, but also perhaps library users' expectations in the area of adequacy/task match are simply too high, and as a consequence of this the libraries need to work towards adjusting these expectations to more manageable levels. This could be done for example by encouraging greater use of inter-library loans facilities in order to obtain more adequate materials, or by encouraging postgraduates to visit other university libraries to find books that they require. By emphasising these different ways of working to their users, libraries can help to bridge the gap that exists between expectation and experience.

At UoWL, the largest gap occurs with the usability property recognition (being able to recognise the features and functions of the library). The gap for this property is smaller at UoS while at CU user experience actually exceeds expectations. These results could be due to the fact that the participants at UoWL are primarily undergraduates and therefore less familiar with the library than the mainly postgraduate participants at the other two institutions. A postgraduate will usually have studied previously for a number of years and while he may not initially be familiar with the particular library that he is using, he will have experience of using a different institution's library meaning that he will understand the features and functions of a university library. However, further analysis of the data from UoWL shows that the gap is slightly larger amongst postgraduates than undergraduates, meaning that this is a problem area for all types of participants at UoWL. This

suggests that UoWL library may wish to review its library induction process in order to explain more fully the features and functions of the library to all its users whatever their level of study. It could also consider refresher courses for second and third year undergraduates who may have missed the initial induction time, or could review its website to include an in-depth virtual induction process using video and text.

The comments made by participants about the usability of their university library at the end of the main parts of the questionnaire also show areas where there are gaps between experience and expectations. These can help to pinpoint particular problems that library users face as they carry out tasks in the library, and can be used in conjunction with the gap analysis to highlight areas of the library that may need attention or improvement. Analysis of the comments received showed that six themes emerged: e-resources, information needs, library stock, praise for the library, technology, and library environment. At UoWL and CU the theme of technology attracted the most comments with concerns being raised about matters such as the number of PCs available, and faulty printers. Clearly technology is now an important part of library provision, but it could be argued that it falls outside of what has traditionally been provided by libraries i.e. books, journals and other materials along with a space to study in. Perhaps university libraries now need to pay further attention to their users' technological needs especially in times of rapid change in this area with for example the move towards greater numbers of e-books.

Additionally amongst the comments made by participants, the theme of library environment attracted the most comments at UoS, and also the second highest number of comments at the other two libraries. There were concerns about noise, opening hours, and desk space. At UoS there were a number of postgraduate students who were keen to work into the early hours as they tried to complete their degree. As society moves towards a culture of longer opening hours with for example supermarkets providing 24-hour opening, it may be time for university libraries to offer the same when a demand exists.

6.4 Which type of policies do UK university libraries have, and do they have user experience or usability policies?

The website survey of library policies was carried out in order to answer this third question. It was shown that there is a core of seven policies that university libraries tend to implement, although none of the 121 libraries surveyed had all seven, while in fact five libraries had none of the policies in place.

The most popular policy, which is in place in 86 per cent of libraries surveyed, is the library access policy which states who may visit the library, what they may do when there, and what if any borrowing rights they have. The second most popular policy, which just under 70 per cent of surveyed libraries were found to have, has a similar theme. The library regulations policy is generally a list of rules and regulations regarding the behaviour of library users, for example whether mobile telephone use is permitted, or the rules for eating and drinking within the library building. The popularity of these two policies is interesting as they could both be described as policies which regulate and control user behaviour, whether these users are students of the university, visitors, or others. They state what may and may not be done by the user in the library environment. Similarly, the sixth most common policy the library computing policy is a set of regulations, in this case for the acceptable use of computing equipment within the library. Nearly one-third of the libraries surveyed have this policy.

The remaining four policies could be described as policies which aim to assist the library user, make the library a better place, and thus improve the library experience. They are firstly the collection development policy, in place in 44.6 per cent of surveyed libraries. This policy explains how the library will be stocked in terms of both physical and electronic items and therefore is aimed at improving a user's experience in terms of the relevancy and adequacy of materials that are available.

Next, 40.5 per cent of surveyed libraries have a library mission policy which outlines the library's aims and objectives, and its role within the larger university environment. This is a policy aimed at outlining the role of the library to users, and describing what they can expect from the library. The customer charter policy, also in 40.5 per cent of surveyed libraries, covers what library users can expect from

the service in terms of service standards and customer care, while the seventh policy, in only 2.5 per cent of surveyed libraries and by far the least popular, is the website policy. This details matters relating to the website such as how its content is maintained and usability related matters, such as whether usability testing is carried out when new web pages are implemented, and whether library users are consulted when these changes occur.

There is therefore a clear contrast between the first three policies discussed, the "regulatory" policies, and the latter four, the "experience" policies.

Regulatory policies:

- Library access policy
- Library regulations policy
- Library computing policy.

Experience policies:

- Collection Development
- Library mission policy
- Customer charter policy
- Website policy.

There are a number of likely reasons that the regulatory policies tend to occur more frequently at the surveyed libraries. Firstly, in any public place there will be laws such as those governing health and safety which must be adhered to, and which therefore need to be stated clearly. For example smoking is not allowed in any UK university library by law and so may be listed as one of the library rules. Secondly, people are accustomed to following laws, rules, and regulations in environments such as the workplace, driving on the roads, or in transport settings such as airports, and as a result may expect to find, or may even feel reassured by the existence of regulatory policies. As an example of this, library users may feel reassured that talking is not permitted in particular sections of the library and may actively choose these areas in which to study because they know it will be quieter and there will be fewer disturbances than in other areas. Thirdly, experience policies may be viewed as secondary to regulatory policies as they are more

abstract in nature, and therefore harder to define. For example it is easier to make a list of rules forbidding certain behaviours such as mobile telephone use, than it is to create a list quantifying exactly how users will be treated in terms of customer service.

An institution's type would also seem to have a bearing on some the policies in place there. Of the regulatory policies, the library access policy is popular amongst all university types with the exception of Other, while the library computing policy occurs fairly infrequently across all types. This could be as a result of rapidly occurring changes in technology meaning that a computing policy has to be updated on a very regular basis, and also because it may be difficult and time-consuming to enforce such a policy. The library regulations policy however occurs more frequently in some of the more traditional types of university with Ancient, University of London, Plate-glass and Red-brick having this policy in more than 80 per cent of surveyed institutions, while this figure is less than 60 per cent in New universities. Of course this policy may exist as a paper list within the library building itself rather than on the library's website, but the lower figure at New universities suggests that there may be a more relaxed approach to rules and regulations, due to the less traditional nature of these places which were often formerly polytechnics or technical colleges.

For the experience policies, the collection development policy is fairly popular in more traditional types of universities. For example 100 per cent of University of London sites have this policy, while less than a third of New universities do. Once again it can be argued that this policy type is associated with older, traditional university libraries while the new universities may feel that it has lost its relevancy in an era of electronic delivery from many different sources.

The library mission policy is common at Ancient universities but less so at New universities. However, this policy can be viewed as a way of summarising what the library is attempting to achieve, and also as a starting point for all other policies. It need only be a short statement but can create a focal point for library staff and users alike.

The third experience policy, the customer charter policy occurs more frequently at the newer institutions of Plate-glass, Red-brick, and New, but less so at the older University of London, and Ancient types. By having this policy in place, libraries are showing that their users and the service they receive are important. However it is possible that many libraries believe this is a part of library provision that does not need to be articulated and that good customer service is an intrinsic part of what the library provides for its users.

The final experience policy, the library website policy occurs at only three surveyed libraries: one New, one Ancient, and one Other. As discussed earlier in this section, this may be because this type of policy can be challenging to define, or library staff may have not even considered having this type of policy. However, it is a way of establishing how the website will evolve over time, and also a way of communicating to users that the library website and their involvement in its evolution through their feedback is important.

There are a small number of university libraries which have details on their websites that touch on the themes of user experience, user interfaces, and usability. However this is not usually within a website policy or a user experience policy. For example the library of University of Bolton uses its quality assurance section to state its aim of improving the user experience, while Newcastle University's library website emphasises user experience in both its customer charter policy and its library mission policy. With Durham University's library website, the collection development policy discusses the importance of the quality of user interfaces. These examples highlight a clear issue with the topics of user experience, user interfaces and usability, which is that while some libraries have recognised the importance of the topics, they have failed to decide where these topics belong when it comes to library policy.

A small minority of libraries have created a library website policy, but as its name suggests this only concerns the library's web pages and not its other interfaces. Library staff might argue that they have no control over the interfaces provided by external suppliers, but it is likely that these suppliers would be receptive to hearing the opinions of those who work in libraries, and the feedback of library users.

There is also a vast majority of libraries which do not address the topics of user experience, user interfaces, and usability at all, and there are a number of potential reasons for this. Firstly, it is possible that the topics are not seen as being relevant or relevant enough to university libraries. However as discussed in Chapter two, recent library research literature suggests the opposite as the number of articles in the area of library usability has increased dramatically in recent years.

Another reason is that possibly there is a lack of confidence amongst library professionals when it comes to these topics, and this could be particularly true amongst those who have been in the profession for many years, or those who do not consider themselves to be highly proficient in IT-related matters. If this is the case, training of library staff in awareness of these topics may be required.

A third reason is that possibly the view being taken in libraries is that discussed by Crawford (2005) in Chapter two, who asked why should libraries care about policies when the real concern is the technology being used in them. Does this mean that the true situation in university libraries is that these topics are seen as important, but that creating policies from the concepts is not seen as important or simply too difficult? A library user experience policy falls under the “experience” type rather than the “regulatory” type of library policy and may therefore be seen as not being as important. Crawford argues the case for a policy regarding library technology because of the unplanned and unintended effects from new systems and changes to existing systems. This view is complemented by Ackerman (2000), who believes that policies need to support human activities in systems in order to reduce socio-technical gaps.

A limitation of the survey of website library policies is that as has been noted, the policies may exist in the form of a printed list within the library or may appear on the library’s intranet. For this reason the follow-up survey was undertaken to find out whether university libraries tend to publish all of their policies on their website. This showed that 68.2% or more than two-thirds of libraries surveyed do publish all of their policies on the website. While this does not mean that this is the case

across the original 121 libraries surveyed, it does add weight to the findings of the survey of website library policies.

While the follow-up survey showed that none of the 22 libraries surveyed have a library user experience policy, it is a policy that some libraries have considered or would consider in the future. Imperial College library has recently convened a user experience group while at the University of Oxford, the Bodleian Libraries responded that they would consider a user experience policy in the future. This highlights that some of the world's leading universities now have user experience as an important topic within their libraries.

6.5 How can a user experience policy bridge the gap between users' experience and expectations of using their university library and its systems?

Chapter two discussed research carried out by Chen et al (2009) in which the case was made for formalised library policies regarding library website usability. These researchers believe that while many academic libraries in the United States have policies, standards, and guidelines in place regarding the usability of their website, they should also have a written policy for it. But why stop at website usability? In a rapidly changing technological library world, a wider user experience policy which is adhered to and regularly reviewed can be a useful tool. It is a way for every university library to bridge the gap between users' experiences and expectations of using their library and its systems. This study has shown that these gaps do exist at UK university libraries and especially in particular areas such as the adequacy and relevancy of the materials available to users.

Just as Petre et al (2006) showed that it is not sufficient to only consider the web interfaces of a system, and that the total customer experience should also be considered, the same thinking can be applied to university libraries. The library website might be highly usable, but if a student cannot find the information he requires, and in a reasonable time, he may become dissatisfied with the library generally. Instead of it becoming a place to enhance learning, it may become a place he avoids visiting.

By thinking of the university library as an information ecology, which O'Day and Nardi (2003) define as being made up of "*...systems of people, technologies, practices and values"* a user experience policy can outline who needs to be involved, which technologies are involved, what needs to be done in terms of practices, as well the values which are as the expected outcomes of the process. Figure 102 summarises this:

People	Technologies	Practices	Values
Library staff Library users Software vendors	Library website E-journals Databases Self-service machines Mobile devices	Usability testing with users Co-ordinating with vendors Keeping abreast of technological developments	Providing a good user experience Providing a user-centred user experience Providing user - friendly interfaces Providing a usable library

Fig. 102. The user experience policy as an information ecology

The people involved in the information ecology are the staff working in the library, the users of the library, and outside parties such as the software vendors who are responsible for some of the library's user interfaces.

The technologies involved are the interfaces of the library website, along with the vendor supplied e-journals and library databases, the self-service machines used to issue and return books and other items, and also increasingly the library interfaces which are now available on mobile devices such as library users' mobile telephones.

The practices within the user experience policy information ecology are the usability testing procedures in place whether these take the form of surveys, focus groups, or detailed task-based testing, in order to receive feedback from actual library users. Sadeh's (2007) discussion of library interfaces concluded that libraries must work with vendors to improve interfaces, and co-ordinating with vendors to do this is another practice that is a vital part of this ecology.

Additionally, those involved in the ecology need to keep abreast of technological developments, and plan for these changes so that the library continues to function in a way that meets users' needs.

Finally, the values of the ecology are providing a good user experience, and one which puts the user at the centre of the experience. The interfaces in the library need to be usable as does the library as a whole entity.

This information ecology can therefore be seen as a basis for a user experience policy in libraries. Tools such as surveys, focus groups, and task-based testing can be a part of the practice of usability testing with users, but each library can tailor the model to fit their own particular environment based on the resources they have available. It has been shown that usability testing does not have to be an onerous task, and can be carried out relatively quickly with only a few users participating. By implementing these practices it can be argued that the gaps between users' experiences and users' expectations can be reduced as problem areas are identified and worked on. Collaboration between libraries and vendors will mean that feedback from library users can be used to improve software interfaces. If this feedback is received from relatively few libraries it is unlikely to make a difference, but if all UK university libraries participate this could have a huge impact on the quality and usability of interfaces. Similarly, by keeping abreast of technological changes, libraries can be prepared for future developments in the library environment.

A library user experience policy should not be seen as simply an "experience" policy. While it has the elements of an experience policy it also needs to be a "regulatory" policy by stating that the practices will be acted upon, on an ongoing regular process.

The follow-up survey of library policies showed that some of the respondents have considered or would consider having a library user experience policy. Figure 103 gives an example of a user experience policy which can be used as a starting point for UK university libraries.

University library user experience policy

- We aim to provide a good, user-centred library experience with user-friendly interfaces to create a usable library.
- We will carry out usability testing with our customers on an ongoing and regular basis. This will be done when there is a major change to one of our systems such as the website or self-service machines. This will also be done if we change our manual systems such as the layout of the library stock, or the classification system.
- The testing takes a number of forms and we will choose a method most suitable to the change taking place and the resources available. For example focus groups with customers, surveys, and task-based testing.
- We will liaise with software vendors to create usable interfaces for the library databases and e-journals. User feedback will be gathered for this purpose.
- Library staff will keep abreast of technological developments to make sure that the library and its systems are as usable as possible.

Fig. 103. An example library user experience policy

6.6 Summary of study

Robson (2002, p.510) suggests that researchers may wish to write about the lessons they have learned from conducting the study. This section will cover this and also make suggestions for further related research. The study's contribution to knowledge will also be discussed.

6.6.1 Review of study

As a research student at the University of West London, the researcher had the opportunity to learn and practise a number of new skills through teaching classes and attending conferences. There were also opportunities to attend some interesting seminars, and study extra research-related modules. It is the

researcher's belief that all of these extra activities have had a positive effect on her research work and as a result she would encourage all research students to participate in these as much as they can.

Starting a research degree can seem a daunting task and the lack of structure compared with a taught course did cause some problems. For this reason having a plan in place for what is to be achieved is vital, as is adhering to this plan while also updating it for any time slippages that occur. It is also important to be decisive for example about which research methods are to be used, as it is easy to be overwhelmed by the number available. This is especially true in a field such as user experience and usability where there are many to choose from, and no clear view from the literature of which is the most suitable. At an early stage in the study the researcher felt a strong leaning towards quantitative research, and agrees with Dawson (2009) who believes that researchers should follow their instincts and carry out the type of research they feel more comfortable with.

Sometimes the timings of tasks can go awry as discovered when approaching Royal Holloway College and the University of Surrey to be sites for the library questionnaire. At Royal Holloway College, the fact that they were doing their own survey at that time meant that they did not wish to participate in the study, while at UoS the fact that ethics clearance was required, delayed the start of the fieldwork. The delay at UoS was not anticipated, and it did have an impact on data collection as the majority of questionnaire participants were postgraduates as a result. A lesson learned from this is that extra time should be allowed for unforeseen delays such as this.

On a positive note, the planning of the carrying out of the questionnaires went well. Having carried out a researcher-administered questionnaire at a public library in 2008, and having learned from that experience that it is unrealistic to plan to do more than about ten questionnaires per day, a plan of work was established. It had also been learned that it can be a stressful and tiring experience to approach many people, and keep saying the same things, and it is also likely that some of those approached will not wish to take part. This previous experience meant that the time needed at each library was able to be estimated very successfully.

Schwalbe (2006, p.7) discusses how every project is constrained by the three factors of scope, time, and cost. This is known as the triple constraint. For this research project, cost was not a problem as the fieldwork could be carried out relatively cheaply. There were the costs to cover of transport for getting to the libraries and for printing the questionnaires, but in total this came to about £300, a manageable amount. The scope of the project was decided at an early stage, and was therefore not an issue. It was time management that proved to be by far the most difficult aspect of the project, and as just discussed, it was vital that a plan was made and followed closely.

The researcher's past experience of working on IT projects (which often run over their time schedule!) had emphasised the importance of accurate estimating of tasks, but without experience of carrying out similar tasks, it can be difficult to estimate how long a piece of work will take. As discussed earlier, previous experience of carrying out questionnaires in libraries meant that it was possible to successfully estimate how much time was required, but other tasks were more difficult to estimate. For example data analysis is a lengthy process and it is difficult to pinpoint exactly how long this will take. There was also the added problem of extra work needing to be scheduled, such as teaching duties or conferences. These tasks although worthwhile could cause time management problems as a great deal of preparation was usually required for them.

Finally, the research process can be a somewhat solitary experience and for someone used to working in a team-driven environment, this was very different. Being project manager and project worker simultaneously was challenging at times without the usual co-workers to discuss ideas with. For these reasons, for this researcher, being a member of a research team in the future may be preferable.

6.6.2 Limitations of the study

It is inevitable that there will be limitations in many research studies, and it is normal to make compromises in research design (Pickard, 2013, p.55). This study is no exception, and does have a number of limitations.

The methods used in this study could be seen as a limitation. The survey method is the main method, but this does have a number of disadvantages. A researcher-administered questionnaire for the library user survey was an effective way of overcoming the problem of non-response to the questionnaire, but this problem was encountered in the two follow-up surveys of libraries with response rates of approximately a half to two-thirds of survey recipients being experienced. While a researcher-administered questionnaire is effective regarding the issue of non-response, there may be researcher bias in the way the questions are asked, or the responses may be different to those that would be given if the participant was filling in the questionnaire himself (Robson, 2002, p.234).

Other methods could have been utilised in this study. For example there could have been interviews, focus groups, or think-aloud protocol with library users. The researcher's leaning towards quantitative methods was one reason for the use of surveys, but these did have a qualitative element allowing for content analysis to be carried out. In the future, the researcher would be pleased to have the opportunity to improve her skills in qualitative research methods. Case study research would be one way of doing this as each case can utilise a number of different research methods, for example a survey along with interviews or focus groups. The survey sites in this study could have been treated as cases with the addition of other research methods, giving a more holistic view of the libraries.

The follow-up survey of university libraries outside the south of England was carried out as an email survey, but the researcher feels that this could have been improved by using interviews with the respondents instead. This is because an interview would have allowed the researcher to ask follow-up questions rather than relying on the respondent to give a full answer to the question posed in the survey. It would not have been possible for the researcher to travel to Scotland or the USA, but a telephone interview would have been a solution to this. Another limitation with this part of the study is that it could be argued that it is obtaining the views of university library staff and not library users. Arguably library staff will see the library differently to library users and may not be aware of the problems facing users.

The limitations of the survey of library website policies have already been discussed: library policies are not necessarily displayed on the library's website as they could be elsewhere such as on the library's intranet or even on a printed list within the library. However, the follow-up survey showed that more than two-thirds of libraries surveyed do in fact have all of their policies on their website. This does not mean that more than two-thirds of the original 121 libraries surveyed do likewise, but it does add more weight to the original survey.

The sampling frame used in the selection of libraries as survey sites, and also in the selection of library survey participants could be seen as a limitation. Purposive sampling was used for this, and it has been argued that there is researcher bias in this (Gray, 2009, p.153) as the researcher selects suitable participants. An alternative to this would have been to select the three library survey sites randomly, and also to have selected the participants in the user survey randomly, for example every tenth person who entered the library. Random sampling was used for the follow-up survey of library policies, but this has also been criticised, as it is not always possible to generalise from the results obtained using this sampling frame (Bryman,1988, p.35).

Another issue with sampling in this study is the sample size. As discussed, there are nearly two-and-a-half million students in the UK, and this study surveyed 120 of them. Similarly, there are 121 universities (according to the Guardian newspaper), and only three of these were used as survey sites. However, this is an exploratory study and its intention was not to generalise, but to explore the issues surrounding library user experience and usability.

6.6.3 Future research

As an exploratory study, one of the aims of this study is make suggestions for areas of further study. User experience in libraries would seem to be a topic in which librarians and researchers are taking increasing interest, and it is a field with scope for future research.

The questionnaire used in this study is one way of measuring library users' satisfaction with the library user experience, and it is a tool that can be used at regular intervals to monitor this. Similarly, university libraries may wish to survey the policies at other libraries to see how they measure user experience and library usability. It would also be beneficial if university libraries were to discuss usability matters on a regular basis within any collaborative groups.

The follow-up survey of university libraries outside England showed that library users and library staff may have differing views about library user experience, It would be interesting to compare the views of users with the views of staff and compare the gaps between their opinions. This is a way of making library staff aware of any issues that their users may be facing.

Key areas where there may be usability issues have been identified in this study: for example the adequacy of the information provided, and further research could concentrate on these more problematic areas in more detail. This could be done with the use of focus groups or detailed interviews with library users. These users could have specific examples of areas where information is not adequate, and they could also have suggestions about how to improve its adequacy.

Recent studies have concentrated on users' experiences with mobile devices in university libraries, and there has been criticism of the services provided, along with concern from library staff that they lack the necessary skills to support users. It is possible that in the future, library users will rely very heavily on these types of services in order to access the materials they need, and will use mobile devices either within the library or from elsewhere to do this. This study has attempted to show that user experience must go beyond the realms of website usability. Future research could therefore investigate the "lived experience" of library users utilising mobile technology, for example the observation of users as they try to complete library tasks using a tablet computer or mobile telephone. Results from this type of research would reflect how mobile services in libraries have improved, and where further improvement is needed. At the current time it could be argued that there would need to be improvement in university mobile library provision in order for library users to rate it highly. As Bomhold (2014) highlights, it would seem that

some libraries have *"lost sight of the user"* regarding mobile library services. However the case may be different two to five years from now if libraries are willing to work on improvements in this area.

Other research could centre on the user experience policy. A user experience policy can be created as a collaboration between library staff and library users. Chapter two discussed the importance of library user studies with it being vital for library services to stay ahead of users as their behaviour changes (Pantry & Griffiths, 2009, p.1), and "*there being an obvious need for user studies"* in libraries (Grifender, 2011). The creation of a user experience policy could be a part of a user study programme, meaning that the policy can be monitored and reviewed on a regular basis to make it as effective as possible.

6.6.4 Contribution to knowledge

The main contribution of this research centres on the idea that a university library is an information ecology with a holistic view being taken and libraries being looked at from a socio-technical viewpoint. It is about not just the library systems but how people interact with them, and complete their required tasks. While this has been researched in other domains such as transport systems and shopping websites, it has not been done extensively in the library domain in either its traditional form or in the now standard hybrid form of a digital and physical library.

In conjunction with this idea, this study has also investigated the way in which this user engagement with libraries can shape effective library policies. By investigating the gap between user experience and user expectation, this exploratory study has made suggestions for a user experience library policy and also shown areas where further research can take place. Library managers may wish to create or to change a user experience policy, and will also be able to see areas where problems exist which can then be worked on to make improvements. Similar investigations in business areas have proven beneficial, and this study has shown that it can be equally beneficial for complex social and educational organisations like university libraries.

6.7 Summary of findings

This study has shown that there are areas where library users are satisfied with the usability of their university library, as well as areas which they are pleased with. Across the three libraries surveyed, participants were more content in the areas of comfort, user-friendliness, relevancy, simplicity, and control, whereas areas of lower satisfaction were adequacy/task match, visual presentation, and access time. Naturally there were variations across the three libraries, but by using these results, each of the libraries will be able to pinpoint their particular problem areas. Other university libraries could also use the questionnaire to find their own problem areas, and build on this with further research if required.

User experience can actually exceed user expectations in some areas of usability, but adequacy/task match was shown to be the property where the largest gap occurs across the three libraries. Improvement of the experience in this area, or a management of user expectations are the ways of dealing with this gap. This also applies to gaps for other usability properties.

The survey of UK university libraries shows that their policies can be seen as either “regulatory” types or “experience” types. The former tend to be more popular at the 121 UK university libraries which were surveyed. This is because there will always be laws which have to be followed, but also because library users may actually feel reassured by the existence of these boundaries, and also because these types of policies are far easier to define than the more abstract “experience” types.

Policies related to user experience are rare at UK universities, and this may be due to these types of policies not being deemed important, a lack of confidence amongst library staff, or that while the concepts surrounding usability and user experience are seen as important, translating them into a policy is seen as being too difficult. This study has shown that the using the theories of information ecologies can be a way of building a user experience policy. Analysing the people, technologies, practices, and values involved creates a framework for the policy which can be adapted according to the resources available at each university library.

In the future, it is likely that there will be an even greater reliance on mobile devices when accessing university library services. However, the library as a place still has importance as studies have shown, and it would seem that this will continue as students use it for individual and group study or simply as a social space. It is clear that the university library is evolving. By taking the “lived experiences” of the actual users of university libraries and their related systems into account, and doing this in conjunction with a user experience policy, the university library can become a place of continuous improvement, which is undoubtedly vital in a time of increasing student expectations, and a time of rapid technological change.

Library user experience and usability is undoubtedly a field growing in importance in the eyes of librarians and researchers. Studies in this sphere can only assist in putting the library user at the centre of the library experience. Additionally and importantly at a time of increasing student numbers, this should lead to a better overall experience for students during their time at university.

7. References

Ackerman, M. 2000. The intellectual challenge of CSCW: the gap between social requirements and technical feasibility. *Human-computer interaction,* Volume 15, Issue 2, p.179-203.

Adikata, A. & Anwar, M. 2006. Student library use: a study of faculty perceptions in a Malaysian university. *Library review,* Volume 55, Number 2, p.106-119.

Aitta, M, Kaleva, S. & Kortelainen T. 2008. Heuristic evaluation applied to library web services. *New library world,* Volume 109, Number 1/2, p.25-45.

Albanese, A. 2006. The Heart of Texas. *Library journal,* Volume 131, Issue 19, p.36.

Aldridge, A. & Levine, K. 2001. *Studying the social world: principles and practice in survey research.* Buckingham: Open University Press.

Alshamari, M. & Mayhew, P. 2009. Technical review: current issues of usability testing. *IETE technical review,* Volume 26, Issue 6, p.402-406.

Andrews, J. 1991. An exploration of students' library problems. *Library review,* Volume 40, Number 1, p.5-14.

Anuradha, K. & Usha, H. 2006. Use of e-books in an academic and research environment. *Program: electronic library and information systems,* Volume 40, Number 1, p.58-62.

Argyrous, G. 2005. *Statistics for research: witha guide to spss.* 2nd edition. London: Sage.

Battleson, B., Booth, A. & Weintrop, J. 2001. Usability testing of an academic library web site: a case study. *The journal of academic librarianship,* Volume 27, Number 3, p.188-198.

Beard, C. & Bawden, D. 2012.University libraries and the postgraduate student: physical and virtual spaces. *New library world,* Volume 113, Number 9/10, p.439-447.

Bernard, H. & Ryan, G. 2010. *Analyzing qualitative data: systematic approaches.* London: Sage.

Bomhold, C. 2013. Mobile services at academic libraries: meeting the users' needs? *Library hi-tech,* Volume 32, Number 2, p.336-345.

Brooke J. 1996. *SUS - a quick and dirty usability scale.* Available at http://www.usabilitynet.org/trump/documents/Suschapt.doc, accessed 29th September 2011.

Brophy, P. 2005. *The academic library*. London: Facet Publishing.

Brunel University. 2010a. *About the university.* Available at http://www.brunel.ac.uk/about/campus.html, accessed 24th November 2010.

Brunel University. 2010b. *About us.* Available at http://www.brunel.ac.uk/life/study/library/aboutus, accessed 24th November 2010.

Bryman, A. 2008. *Social research methods*. Oxford University Press.

Bryman, A. 1988. *Quantity and quality in social research.* London: Routledge.

Burns, R. 2000. *Introduction to research methods.* London: Sage.

Bucks New University. 2010a. *Facts and figures.* Available at http://bucks.ac.uk/about/facts_and_figures.aspx, accessed 24th November 2010.

Bucks New University. 2010b. *How we are structured.* Available at http://bucks.ac.uk/about/structure.aspx, accessed 24th November 2010.

Camara, S. & Abdelnour-Nocera, J. 2010. A socio-technical approach to making explicit interculturality in collaborative multi-disciplinary settings. *Proceedings of ICIC '10,* p.121-130.

Canterbury Christchurch University. 2012. *Library policies.* http://www.canterbury.ac.uk/library/library-policies/library-policies.asp, accessed 1st November 2012.

Carlson, S. 2001. The deserted library. *Chronicle of higher education,* Volume 48, Issue 12, p.35-38.

Carlson, S. 2009. Is it a library? a student center? The athenaeum opens at groucher college. *Chronicle of higher education,* Volume 56, Issue 4/5, p.16-17.

Chen, Y., Germain, C. & Yang, H. 2009. An exploration into the practices of library web usability in ARL academic libraries. *Journal of the american society for information science and technology,* Volume 60, Issue 5, p.953-968.

Cockerell, B. & Jayne, E. 2002. How do I find an article? Insights from a web usability study. *The journal of academic librarianship,* Volume 28, Number 3, p.122-132.

Coker, G. 2007.Usability in emerging e-content environments. *Information services and use,* Volume 27, Number 4, p.179-184.

Colebatch, H. 1998. *Policy.* Buckingham: Open University Press.

Complete University Guide. 2015a. *University league table 2016.* Available at http://www.thecompleteuniversityguide.co.uk/league-tables/rankings, accessed 1st August 2015.

Complete University Guide. 2015b. *University of surrey.* Available at http://www.thecompleteuniversityguide.co.uk/surrey, accessed 1st August 2015.

Corbus, L., Dent, V. & Ondrusek, A. 2005. How twenty-eight users helped redesign an academic library web site. *Reference & user services quarterly,* Volume 44, Number 3, p.232-246.

Coughlan, S. 2013. *University entry levels reach 49%.* BBC News, 24th April 2013 [Online]. Available at http://www.bbc.co.uk/news/education-22280939, accessed 22nd May 2013.

Crawford, W. 2005. Thinking in policy terms. *Library technology reports,* March-April, p.4-10.

CU. 2015a. *Our heritage..* Available at http://www.cranfield.ac.uk/about/cranfield/heritage/, accessed 1st August 2015.

CU. 2015b. *Cranfield is distinctive.* Available at http://www.cranfield.ac.uk/about/cranfield/cranfield-is-distinctive/, accessed 1st August 2015.

CU. 2015c. *Our campuses.* Available at http://www.cranfield.ac.uk/locations/index.html, accessed 1st August 2015.

CU. 2015d. S*tudent numbers.* Available at http://www.cranfield.ac.uk/about/cranfield/facts-and-figures/total-number-of-students-201213.html, acessed 1st August 2015.

Czaja, R. & Blair, J. *Designing surveys: a guide to decisions and procedures.* London: Sage.

David, M. & Sutton, C. 2004. *Social research: the basics.* London:Sage.

Dawson, C. 2009. *Introduction to research methods: a practical guide for anyone undertaking a research project.* Fourth edition. Oxford: How to books.

Dearnley, J. & McKnight, C. 2001. The revolution starts next week: the findings of two studies considering electronic books. *Information services and use,* Volume 21, Issue 2, p.65-78.

De Montfort University. 2012. *Customer services statement.* Available at http://www.library.dmu.ac.uk/Images/CSE/statement.pdf, accessed 20th December 2012.

Dillon, A. 2001. Beyond usability:process, outcome and affect in human computer interactions. *Canadian journal of information and library science,* Volume 26, Issue 4, p.57-69.

Donald, D. 1998. *The design of everyday things.* London: MIT Press.

Durham University. 2012.*Library collection management policy.* Available at http://www.dur.ac.uk/resources/library/collmgt_policy.pdf , accessed 4th November 2012.

Eason, K. 1988. *Information technology and organizational change.* London: Taylor and Francis

Ebenezer, C. 2003. Usability evaluation of an NHS library website. *Health Information and Libraries Journal*, Volume 20, Number 4, p.134-142.

Ferris, B., Watkins, K. & Borning, A. 2010. OneBus Away: results from providing real-time arrival information for public transit. *Proceedings of CHI 2010.*, p.1807-1816.

Financial times. 2015. Global MBA ranking 2015. *The financial times* [online]. Available at http://rankings.ft.com/businessschoolrankings/global-mba-ranking-2015, accssed 1st August 2015.

Foster & Partners. 2013.*Projects.* Available at http://www.fosterandpartners.com/Projects/ByType/Default.aspx, accessed 13th February 2013.

Garcia-Marco, F. 2011. Libraries in the digital ecology: reflections and trends. *The electronic library,* Volume 29, Number 1, p.105-120.

Gelfand,J. 2005. Library as changing place: viewpoints from university undergraduates. *Library hi tech news,* Volume 22, Number 4,p.10-12.

George, C. A. 2009. *User-centred library websites : usability evaluation methods*. Oxford: Chandos Publishing.

Gerke, J., & Maness, J. 2010. The physical and the virtual: the relationship between library as place and electronic collections. *College and research libraries,V*olume 71, Number 1, p.20-31.

Glasgow Caledonian University. 2012. *The library strategy 2011-14.* Available at http://www.gcu.ac.uk/media/gcalwebv2/library/library%20srategy%202011_14.complete.pdf , accessed 3rd November 2012.

Gray, D. 2009. *Doing research in the real world.* 2nd edition. London: Sage.

Greenfield, T. 2002. *Research methods for postgraduates.* 2nd edition. London: Arnold.

Greifeneder , E. 2011. Users and technology: are we doing research now?. *Library hi tech,* Volume 29, Number 2, p.205-209.

Grimes, P. & Charters, M. 2000. Library use and the undergraduate economics student. *College student journal,* Volume 34, Issue 4, p.557-571.

The Guardian. 2012. *University 2013: university league table.* The Guardian, 21st May 2012 [Online]. Available at University guide 2013: University league table | Education | theguardian.com, accessed 25th April 2013.

The Guardian. 2015. *University league tables 2016.* The Guardian, 25th May 2015 [Online]. Available at http://www.theguardian.com/education/ng-interactive/2015/may/25/university-league-tables-2016, accessed 1st August 2015.

Gurney-Read, J. 2015. *Record number of students applying to university.* Daily Telegraph, 30th January 2015 [Online]. Available at http://www.telegraph.co.uk/education/universityeducation/11377594/Record-number-of-students-applying-to-university.html#disqus_thread, accessed 14th July 2015.

Hannaford, A. 2012. *Library futures: is worcester's hive a model for university development?* The Guardian, 25th October 2012 [Online]. Available at http://www.theguardian.com/higher-education-network/blog/2012/oct/25/hive-library-worcester-university-council, accessed 23rd August 2013.

Harris, S. 2012. *Moving towards an open access future: the role of academic libraries.* Available at http://www.uk.sagepub.com/repository/binaries/pdf/Library-OAReport.pdf, accessed 23rd August 2013.

HEFCE.2014. *Higher education in england, 2014.* Available at http://www.hefce.ac.uk/heinengland/2014/, accessed 4th October 2014.

HESA. 2015. *Free online statistics- students and qualifiers.* Available at https://www.hesa.ac.uk/stats, accessed 13th July 2015.

Hill, M. 2005.*The public policy process.* 4th ed. Harlow: Pearson Longman.

Inglesant, P. & Sasse M. 2007. Usability is the best policy: public policy and the lived experience of transport systems in London. *Proceedings of HCI 2007,* p.35-44.

ISO. 2010. I*SO 9241-210:2010 ergonomics of human-system interaction - part 210: human-centred design for interactive systems.* Available at http://www.iso.org/iso/iso_catalogue/catalogue_ics/catalogue_detail_ics.htm?csnumber=52075, accessed 12th April 2015.

Jamali, H., Nicholas, D. & Rowlands, I. 2009. Scholarly e-books: the views of 16,000 academics: results from the JISC national e-book observatory. *Aslib proceedings: new information perspectives,* Volume 61, Number 1, p.33-47.

Jiao, Q. & & Onwuegbuzie, A. 2004. The impact of information technology on library anxiety: the role of computer attitudes. *Information technology and libraries.* Volume 23, Number 4, p.138-144.

JISC. 2009. *Libraries of the future.* Available at http://www.jisc.ac.uk/media/documents/publications/lotfbrochure.pdf, accessed 23rd August 2013.

JISC. 2010. *Designing spaces for effective learning: a guide to 21st century learning space design.* Available at http://www.jisc.ac.uk/media/documents/publications/learningspaces.pdf, accessed 29th August 2013.

Kang, Y., Wang, M. & Lin, R. 2009. Usability evaluation of e-books. *Displays,* Volume 30, Issue 2, p.49-52.

Karle, E. 2008. Invigorating the academic library experience: creative programming ideas. *College & research libraries news,* Volume 69, Issue 3. p.141-144.

Kingston University. 2010a. *Facts and figures: what you'll find at the university.* Available at http://www.kingston.ac.uk/aboutkingstonuniversity/factsandfigures/, accessed 24th November 2010.

Kingston University. 2010b.*Information services .* Available at http://www.kingston.ac.uk/informationservices/, accessed 24th November 2010.

Kingston University. 2010c. *How to find us.* Available at http://www.kingston.ac.uk/informationservices/usingthelibrary/how_to_find_us.html, accessed 24th November 2010.

Koohang, A. 2004. Development and validation of an instrument for assessing users' views about the usability of digital libraries. *Issues in Informing Science & Information Technology*, Volume 1, p.55-63.

Koohang, A. & Ondracek, J. 2005. Users' views about the usability of digital libraries. *British Journal of Educational Technology,* Volume 36, Number 3, p.407-423.

Kumar, R. 2014. *Research methodology: a step-by-step guide for beginners.* Fourth edition. London: Sage.

Lazar, J., Bederson, B., Hochleiser, H., Johnson, J. & Karat, C. 2005. Making an impact in your community: HCI and US public policy. *CHI '05 Extended Abstracts on Human Factors in Computing Systems,* p.2041-2042.

Lazar, J., Feng, J. & Hochheiser, H. 2010. *Research methods in human-computer interaction.* Chichester: John Wiley & Sons.

Lefebvre, M. 2002. The library as congenial space: the saint Mary's experience. *New library world,* Volume 103, Number 1172/73, p.21-29.

Leitao, B. & Vergueiro, W. 2000. Using the focus group approach for evaluating customers' opinions: the experience of a Brazillian academic library. *New library world,* Volume 101, Number 1154, p.60-65.

Lewis, K. & Hepburn, P. 2010. Open card sorting and factor analysis: a usability case study. *The electronic library,* Volume 28, Number 3, p.401-416.

Lippincott, J. 2010. A mobile future for academic libraries. *Reference services review,* Volume 38, Number 2, p.205-213.

Magoolaghan, M. 2008. Redesigning the library experience. *Bulletin of the American society for information science and technology,* Volume 35, Number 1, p.41-43.

Makri, S., Blandford, A. & Gow, J. 2007. A library or just another information resource? A case study of users' mental models of traditional and digital libraries*. Journal of the american society for information and science technology,*Volume 58, Issue 3, p.433-445.

Manchester Metropolitan University. 2012. *Web publishing requirements.* Available at http://www.mmu.ac.uk/policy/pdf/policy_ref_Web_Requirements.pdf, accessed 16th November 2012.

Manzari, L. & Trinidad-Christensen, J. 2006. User-centred design of a web site for library and information science students: heuristic evalution and usability testing. *Information technology and libraries,* Volume 25, Number 3, p.163-169.

Marsh, A. & Bovaird, C. 2008. A place for learning: rethinking academic library buildings. *Sconul focus,* 44, p.72-74.

May, T. 2001. *Social research methods: issues, methods and process.* Third edition. Buckingham: Open University Press.

Middlesex University. 2010a. *About us.* Available at http://www.mdx.ac.uk/aboutus/index.aspx ,accessed 24th November 2010.

Middlesex University. 2010b. *Learning environment.* Available at http://www.mdx.ac.uk/facilities/learning/index.aspx, accessed 24th November 2010.

Mills, J. & Lodge, D. 2006. Affect, emotional intelligence and librarian-user interaction. *Library review,* Volume 55, Number 9, p.587-597.

Mintzberg, H. & Quinn, J. 1996. *The strategy process: concepts, contexts, cases.* New Jersey: Prentice-Hall.

Munro, K. & Stevenson. 2013. Bridging the mobile skills gap for library staff. *Sconul focus, 58*, p.16-19.

Nardi, B. & O'Day, V. 1999. Information ecologies: using technology with heart. *First monday,* Volume 4, Number 5, Available at http://firstmonday.org/ojs/index.php/fm/article/view/672/582, accessed 31st August 2013.

Newcastle University. 2012a. *Strategic plan.* Available at http://www.ncl.ac.uk/library/about/strategic_plan/priorities.php, accessed 19th November 2012.

Newcastle University. 2012b. *Customer care.* Available at http://www.ncl.ac.uk/library/about/care.php, accessed 19th November 2012.

Ngimwa, P. & Adams, A. 2011. Role of policies in collaborative design process for digital libraries within African higher education. *Library hi-tech,* Volume 29, Issue 4, p.678-696.

Nicholas, D., Rowlands, I., Clark, D. & Huntington, P. 2008. UK scholarly e-book usage: a landmark survey. *Aslib proceedings: new information perspectives, V*olume 60, Number 4, p.311-334.

Nielsen, J. 2013. *10 Usability Heuristics for User Interface Design.* Available at 10 Heuristics for User Interface Design: Article by Jakob Nielsen, accessed 1st September 2013.

Nielsen, J. 1993. *Usability engineering.* London: Academic Press.

Nielsen, J. & Mack, R. 1994. *Usability inspection methods.* New York: Chichester: John Wiley & Sons.

Nowlam, G. 2013. Going mobile: creating a mobile presence for your library. *Library new world,* Volume 114, Number 3/4, p.142-50.

NUS. 2008. *NUS student experience report.* Available at http://www.nus.org.uk/PageFiles/4017/NUS_StudentExperienceReport.pdf, accessed 31st August 2013.

Oates, B. J. 2006. *Researching information systems and computing*. London: Sage.

OCLC. 2012. *UK academic libraries: a snapshot of priorities and perspectives.* Available at http://www.oclc.org/content/dam/oclc/reports/uk-libraries/214758ukb-A-Member-Communication-Survey-Report-UK-academic.pdf, accessed 23rd August 2013.

O'Day, V. & Nardi, B. 2003. *An ecological perspective on digital libraries.* In Digital library use: social practice in evolution, edited by Bishop. A., House, N. & Butterfield, B., Cambridge MA: MIT Press.

O'Leary, Z. 2005. *Researching real-world problems : a guide to methods of inquiry.* London: Sage.

Oppenheim, A. 1992. *Questionnaire design, interviewing and attitude measurement.* London: Continuum.

Pantry, S. & P. Griffiths. 2009. *How to give your users the LIS services they want*. London: Facet.

Paterson, L. & Low, B. 2011. Student attitudes towards mobile library services for smartphones. *Library hi-tech,* Volume 29, Number 3, p.412-423.

Paton, G. 2010. *Warning over university budget cuts.* Daily Telegraph, 18th March 2010 [Online]. Available at http://www.telegraph.co.uk/education/educationnews/7465922/Warning-over-university-budget-cuts.html, accessed 22nd May 2013.

Paton, G. & Stubbins, R. 2013. *Fees backlash leads to sharp decline in student numbers.* Daily Telegraph, 18th January 2013 [Online]. Available at http://www.telegraph.co.uk/education/universityeducation/9811776/Fees-backlash-leads-to-sharp-decline-in-student-numbers.html, accessed 22nd May 2013.

Pazur, I. 2014. Attitude of the Rudjer Boskovic Institute's scientists to the small screen mobile devices library services. *Library hi-tech,*Volume 32, Number 4, p.628-44.

Pendell, K. & Bowman, M. 2012. Usability study of a library's mobile website: an example from portland state university. *Information technology and libraries,* Volume 31, Number 2, p.45-62.

Petre, M., Minocha, S. & Roberts, D. 2006. Usability beyond the website: an empirically grounded e-commerce evaluation instrument for the total customer experience. *Behaviour & Information Technology,* Volume 25, Issue 2, p.189-203.

Pfotenhauer, S., Jones, C., Saha, K. & Jasonoff, S. 2012. Learning from Fukushima. *Issues in science and technology,* Spring 2012, Volume 28, Issue 3, p.79-84.

Pickard, A. J. 2013. *Research methods in information*. Second edition. London: Facet.

Pomerantz, J. & Marchionini, G. 2007. The digital library as place. *Journal of documentation,* Volume 63, Number 4, p.505-533.

Porter, L. 2007. Library applications of business usability testing strategies.*Library hi-tech,* Volume 25, Number 1, p.126-135.

Powell, M. 2002. Designing library space to facilitate learning: a review of the UK higher education sector.*Libri,* Volume 52, Number 2, p.110-120.

Queen Mary University. 2012. *Strategic objectives.* Available at http://www.library.qmul.ac.uk/strategic_objectives, accessed 23rd November 2012.

Randomizer. 2015. *Research randomizer.* Available at http://www.randomizer.org/, accessed 5th July 2015.

Ratcliffe, R. & Shaw, C. 2015. *Almost half of English universities plan to recruit more students after cap is lifted.* The Guardian, 18th March 2015 [Online]. Available at http://www.theguardian.com/higher-education-network/2015/mar/18/almost-half-of-english-universities-plan-to-recruit-more-students-after-cap-is-lifted, accessed 14th July 2015.

Reed, D. & Wright, P. 2006. Experiencing BLISS when becoming a bus passenger, *DIS '06: Proceedings of the 6th conference on designing interactive systems,* p.291-300.

Reisz, M. 2013. *British library pledges support to university libraries.* Times Higher supplement, 14th March 2013 [Online]. Available at http://www.timeshighereducation.co.uk/news/british-library-pledges-support-to-university-libraries/2002424.article, accessed 23rd August 2013.

Richardson, B. 1994. Socio-technical disasters: profile and prevalence. *Disaster prevention and management,* Volume 3, Issue 4, p.41-69.

Robson, C. 2002. *Real world research : a resource for social scientists and practitioner-researchers*. Second edition. Oxford: Blackwell.

Robson, C. 2011. *Real world research : a resource for social scientists and practitioner-researchers*. Third edition. Chichester: John Wiley & Sons.

Rogers, R. & Preston, H. 2009. Usability analysis for redesign of a Caribbean academic library web site: a case study. *OCLC systems & services: international digital library perspectives*, Volume 25, Number 3, p.200-211.

Rojeski, M. 2012. User perceptions of ebooks versus print books for class reserves in an academic library. *Reference services review.* Volume 40, Number 2, p.228-241.

Rowlands, I., Nicholas, D., Williams, P., Huntingdon, P., Fieldhouse, M., Gunter, B.,Withey, R., Jamali, H., Dobrowolski, T. & Tenopir, C. 2008. The google generation: the information behaviour of the researcher of the future. *Aslib proceedings:new information perspectives,* Volume 60, Number 4, p.290-310.

Royal Holloway. 2010a. *Facts and figures.* Available at http://www.rhul.ac.uk/aboutus/factsandfigures/home.aspx, accessed 24th November 2010.

Royal Holloway. 2010b. *Introduction to library services.* Available at http://www.rhul.ac.uk/library/aboutus/introduction.aspx, accessed 24th November 2010.

Rugg, G. & Petre, M. 2007. *A gentle guide to research methods.*Maidenhead: Open University Press.

Sadeh, T. 2007. Time for a change: new approaches for a new generation of library users. *New library world,* Volume 108, Number 7/8, p.307-316.

Sarantakos, S. 2005. *Social research*. Basingstoke: Palgrave Macmillan.

Saunders, M., Lewis, P. & Thornhill, A. 2007. *Research methods for business students.* 4th edition. Harlow: Pearson Education.

SCONUL. 2013a. *About sconul.* Available at http://www.sconul.ac.uk/page/about-sconul, accessed 25th May 2013.

SCONUL. 2013b. *The value of academic libraries.* Available at http://www.sconul.ac.uk/page/the-value-of-academic-libraries, accessed 25th May 2013.

Secker , J. 2008. Social software, libraries and distance learners: literature review. Available at http://eprints.lse.ac.uk/4058/1/LASSIE_lit_review%28LSERO%29.pdf, accessed 30th August 2013.

Seffah, A., Donyaee M., Kline R. &H. Padda. 2006. Usability measurement and metrics: a consolidated model. *Software quality journal,*14, pp159-178.

Showers, B. 2012. Data-driven library infrastructure: towards a new information ecology. *Insights,* 25(2), p.150-154.

Showers, B. & Enright, S. 2013. The future of library systems. *Sconul focus, 59*, p.4-6.

Sidorko, P. & Woo, E. 2008. Enhancing the user experience: promoting a service culture through customized staff training. *Library management,* Volume 29, Number 8/9, p.641-656.

Social Psychology Network. 2015. *Social psychology network.* Available at http://www.legacy.socialpsychology.org//plous.htm, accessed 5th July 2015.

Sommerville, I. & Dewsbury, G. 2007. Dependable domestic systems design: a socio-technical approach.*Interacting with computers,* 19(4), p.438-456.

Southampton Solent University. 2012. *Library website policy.* Available at https://portal.solent.ac.uk/library/help/rules-and-regulations/library-website-policy.aspx, accessed 19th November 2012.

Spool, J. 2007. *The difference between usability and user experience.* Available at http://www.uie.com/brainsparks/2007/03/16/the-difference-between-usability-and-user-experience/, accessed 1st August 2015.

Stelmaszewska, H. & Blandford, A. 2004. From physical to digital: a case study of computer scientists' behaviour in physical libraries. *International journal of digital libraries,* Volume 4, Issue 2, p.82-92.

St Mary's University. 2010. *Why choose St Mary's?* Available at http://www.smuc.ac.uk/undergraduate/why-choose-st-marys.htm, accessed 24th November 2010.

The Student Room. 2013. *Types of university.* Available at http://www.thestudentroom.co.uk/wiki/Types_of_University, accessed 23rd August 2013.

Swain, H. 2012. *Learning for free online.* The Guardian, 23rd October 2012 [Online]. Available at http://www.theguardian.com/education/2012/oct/23/free-online-distance-learning, accessed 24th May 2013.

Taylor, S. 2007. *Business statistics for non-mathematicians.* Second edition. Basingstoke: Palgrave Macmillan.

Thomas, G. 2011. *How to do your case study: a guide for students and researchers.* London: Sage.

Thompson, S. 2003.Remote observation strategies for usability testing. *Information technology and libraries,* Volume 22, Number 1, p.22-31.

UCAS. 2011. *About us.* Available at http://www.ucas.com/about_us/stat_services/statisticalfaqs/coverage/faq3, accessed 2nd October 2011.

University of Bolton. 2012. *Quality assurance.* Available at http://digitalcommons.bolton.ac.uk/library/About-the-Library/Quality-Assurance.aspx accessed 1st November 2012.

University of Cambridge. 2012. *Accessibility of web pages.* Available at http://www.lib.cam.ac.uk/disabledreaders/accessibility.html, accessed 13th November 2012.

University of Michigan. 2015. *User experience department.* Available at http://www.lib.umich.edu/library-information-technology/user-experience-department, accessed 1st August 2015.

University of Reading. 2010a. *Introduction to Reading.* Available at http://www.reading.ac.uk/about/about-reading.aspx , accessed 24th November 2010.

University of Reading. 2010b. *Library: collections.* Available at http://www.reading.ac.uk/library/using/collections/lib-collections.aspx , accessed 24th November 2010.

University of Sheffield. 2012. *Our strategic themes.* Available at http://www.shef.ac.uk/library/about/strategictheme1, accessed 15th November 2012.

University of St Andrews. 2012. *Library objectives.* Available at http://www.st-andrews.ac.uk/library/regulations/objectives, accessed 2nd November 2012.

University of Virginia. 2015. *User experience at the u.va library.* Available at https://ux.library.virginia.edu/, accessed 1st August 2015.

UoS. 2015a. *About us.* Available at http://www.surrey.ac.uk/about/history/, accessed 1st August 2015.

UoS. 2015b. *Faculties.* Available at http://www.surrey.ac.uk/faculties/, accessed 1st August 2015.

UoWL. 2015a. *History.* Available at http://www.uwl.ac.uk/about-us/how-university-works/history,accessed 1st August 2015.

UoWL. 2015b.*Student profile.* Available at http://www.uwl.ac.uk/about-us/how-university-works/student-profile, accessed 1st August 2015.

UoWL. 2015c. *Academic schools.* Available at http://www.uwl.ac.uk/academic-schools, accessed 1st August 2015.

UX Lib. 2015. *UX lib: user experience in libraries.* Available at http://uxlib.org/, accessed 14th July 2015.

Walliman, N. 2006. *Social research methods.* London: Sage.

Watson, L. 2008. Libraries for the 21st century. In Earnshaw, R. & Vince, J. (eds). *Digital convergence - libraries of the future.* London:Springer.

Weave. 2015. *Weave: journal of library experience.* Available at http://weaveux.org/, accessed 14th July 2015.

Wisnieswski, J. 2011. Mobile usability: libraries, librarians and mobile services. *Bulletin of the american society for information science and technology,* Volume 38, Number 1, p.30-32.

Wu, S. & Lanclos, D. 2011.Re-imagining the users' experience: an ethnographic approach to web usability and space design. *Reference services review,* Volume 39, Number 3, p. p.369-389.

Yin, R. 2009. *Case study research: design and methods.* Fourth edition. London:Sage.

8. Appendices

8.1. Library user survey

The following pages contain a copy of questionnaire from the library user survey.

Library Questionnaire **Number :**
University : **Date** : / /20
Campus :

The aim of this questionnaire is to obtain users' opinions of their university library. This is for a PhD study looking at user experiences and library system usability. Names of participants are not required, and all data collected will be treated in confidence and only used for the purpose of this study.
It will take 5-10 minutes to complete.

Part A – Background information

Study/teaching field e.g. Psychology, Computing etc :

Please tick the answers which apply :

Age : □ 18-24 □ 25-34 □ 35 and over

Gender : □ Male □ Female

Type : □ Undergraduate □ Postgraduate □ Research student □ Staff □ Other

FT/PT student/staff : □ FT □ PT

Year of study (if applicable) : □ 1 □ 2 □ 3 □ 4+

Part B – Library use

Please tick the answers which apply:

How often do you use the university library building(s)?
: □ Often(1-2 times per week or more) □ Occasionally(1-2 times per month) □ Rarely or never

How often do you use the university library web site?
: □ Often(1-2 times per week or more) □ Occasionally(1-2 times per month) □ Rarely or never

If you do use the library website where do you most often access it from?

: □The university library building □ Home or elsewhere e.g. mobile 'phone □ More or less equally from both of these

If you do use the library building, what activities do you use it for? Please tick all that apply.

□ Borrowing and returning books or other materials
□ Consulting books or other materials
□ Locating books or materials from other universities/institutions
□ Enquiries with library staff
□ Individual study with your own materials
□ Individual study with library books and materials
□ Accessing computers
□ Group work
□ Other –please state _____

If you do use the library website, what activities do you use it for? Please tick all that apply.

□ Searching the catalogue for books and materials
□ Searching the databases and e-journals for articles
□ Finding other library-related information
□ Looking at e-books
□ Simultaneously finding information from a number different library sources
□ Other –please state

_____

If you never use the library or its website, why is that?

Part C – Current views

Please tick the answers which apply using the following scale:

5=strongly agree 4=agree 3=neither agree or disagree 2=disagree 1= strongly disagree

Please indicate your response to each of the items that follow for your **current views** regarding your experiences of using the university library and its systems such as the website, catalogue, self-service machines, databases and e-journals.

Q1. The university library is simple to use ***(simplicity)***

□ 1 □ 2 □ 3 □ 4 □ 5

Q2. I feel at ease using the library ***(comfort)***

□ 1 □ 2 □ 3 □ 4 □ 5

Q3. The library is user friendly ***(user-friendliness)***

□ 1 □ 2 □ 3 □ 4 □ 5

Q4. I feel in control of what I'm doing when using the library ***(control)***

□ 1 □ 2 □ 3 □ 4 □ 5

Q5. The information I access in the library is readable and uncluttered ***(readability)***

□ 1 □ 2 □ 3 □ 4 □ 5

Q6. The information accessed in the library is adequate ***(adequacy/task match)***

□ 1 □ 2 □ 3 □ 4 □ 5

Q7. I can find my way around the library with ease ***(navigability)***

□ 1 □ 2 □ 3 □ 4 □ 5

Q8. I quickly understand the features and functions of the library ***(recognition)***

□ 1 □ 2 □ 3 □ 4 □ 5

Q9. I can find the information I need in a reasonable time ***(access time)***

□ 1 □ 2 □ 3 □ 4 □ 5

Q10. The information I get from the library is relevant ***(relevancy)***

□ 1 □ 2 □ 3 □ 4 □ 5

Q11. The consistency of terms, words and actions throughout the library is evident ***(consistency)***

□ 1 □ 2 □ 3 □ 4 □ 5

Q12. Signage and text to grab my attention are present in the library ***(visual presentation)***

□ 1 □ 2 □ 3 □ 4 □ 5

Q13. The overall user experience/usability in the library is good

□ 1 □ 2 □ 3 □ 4 □ 5

Part D – Perceived importance

Please tick the answers which apply using the following scale:

5=very important 4=important 3=somewhat important 2=slightly important 1= not important at all

Please indicate your response to each of the items that follow to rate the **importance of each of the usability properties** with regard to the university library and its systems such as the website, catalogue, self-service machines, databases and e-journals.

Q1. How important is **simplicity** (the library is simple & straightforward to use)?

□ 1 □ 2 □ 3 □ 4 □ 5

Q2. How important is **comfort** (being at ease using the library)?

□ 1 □ 2 □ 3 □ 4 □ 5

Q3. How important is **user-friendliness** (the library is easy to use & user-friendly)?

□ 1 □ 2 □ 3 □ 4 □ 5

Q4. How important is **user control** (being in control of actions in the library, knowing what to do)?

□ 1 □ 2 □ 3 □ 4 □ 5

Q5. How important is **readability** (readable & uncluttered information in the library)?

□ 1 □ 2 □ 3 □ 4 □ 5

Q6. How important is **adequacy/task match** (adequate information found in the library)?

□ 1 □ 2 □ 3 □ 4 □ 5

Q7. How important is **navigability** (being able to easily find one's way around in the library)?

□ 1 □ 2 □ 3 □ 4 □ 5

Q8. How important is **recognition** (being able to understand/ recognise the features & functions of the library)?

□ 1 □ 2 □ 3 □ 4 □ 5

Q9. How important is **access time** (being able to find information in a reasonable time in the library)?

□ 1 □ 2 □ 3 □ 4 □ 5

Q10. How important is **information relevancy** (the information in the library being relevant)?

□ 1 □ 2 □ 3 □ 4 □ 5

Q11. How important is **consistency** (words, terms and actions in the library being consistent)?

□ 1 □ 2 □ 3 □ 4 □ 5

Q12. How important is **visual presentation** (signage and text grab attention in the library)?

□ 1 □ 2 □ 3 □ 4 □ 5

Q13. How important overall is **a good user experience/usability** in your university library?

□ 1 □ 2 □ 3 □ 4 □ 5

Part E – Other issues

Can you think of any other user experience or system usability issues in the library?

These comments could help to improve your university library. Would you be happy for them to be passed onto staff in the university library?

□ Yes □No

Thank you for taking part.